UG (except BBA) CET Sample Paper

ENGLISH: (40 Questions)

I: Complete the sentences

1. The pilot was _____ injured, he died within half an hour.

   A. seriously
   B. fatally
   C. fatefully
   D. vitally

2. The punch made the boxer _____ in pain.

   A. wince
   B. gape
   C. grumble
   D. fumble

3. Since one cannot read every book, one should be content with making a _____ selection.

   A. normal
   B. standard
   C. moderate
   D. judicious

4. Satish was _____ with a natural talent for music.

   A. given
   B. found
   C. endowed
   D. entrusted

5. If greater security measures had been taken, the tragedy might have been _____.

   A. removed
   B. repeated

C. restrained
D. averted

6. The students were asked to _____ the words given in the two columns.

A. Fill
B. Correspond
C. Match
D. equal

II. In each of the following questions, out of the four alternatives, choose the one which can be substituted for the given word/sentence

7. Music sung or played at night below a person's window

A. serenade
B. sonnet
C. lyric
D. primo

8. A government by the nobles

A. Democracy
B. Bureaucracy
C. Autocracy
D. Aristocracy

9. A man of lax moral

A. Ruffian
B. Licentious
C. Pirate
D. Vagabond

10. Large scale departure of people

A. Migration
B. Emigration
C. Immigration
D. Exodus

11. To send an unwanted person out of the country

A. Exclude
B. Ostracize
C. Deport
D. Expatriate

12. A short, usually amusing, story about some real person or event

A. Anecdote
B. Antidote
C. Tale
D. Allegory

III. In the following sentences given below, a word is underlined. For each of the underlined word, 4 words are listed below each sentence. Choose the word nearest in meaning to the underlined word.

13. The boy gave a vivid description of all that happened.

A. brilliant
B. fresh
C. explanatory
D. picturesque

14. It is compulsory for all the students to join this tour.

A. regular
B. necessary
C. dutiful
D. obligatory

15. The teacher felt that the student lacked discrimination in the study of his data.

A. imagination
B. good taste
C. good judgement
D. objectivity

16. When youngsters do not have good role-models to <u>emulate</u> they start searching for them among sportsmen or film stars.

A. inhabit
B. imitate
C. mollify
D. modify

17. The invasion forces had no artillery and were completely <u>annihilated</u>.

A. reduced
B. destroyed
C. dismembered
D. split

18. Some of the discoveries of modern science are simply <u>marvellous</u>.

A. Praiseworthy
B. Commendable
C. Amazing
D. Admirable

19. India has made <u>spectacular</u> progress in Science and technology.

A. Remarkable
B. Great
C. Formidable
D. super

<u>IV. In the following sentences given below, a word is underlined. For each of the underlined word, 4 words are listed below each sentence. Choose the word which is closest to the opposite in meaning of the underlined word.</u>

20. Self-reliance has been <u>adopted</u> as an important objective of economic planning in modern India.

A. refused
B. forsaken
C. denied
D. discarded

21. He was in a dejected mood.

A. jubilant
B. rejected
C. irritable
D. romantic

22. There was a marked deterioration in his condition.

A. improvement
B. revision
C. reformation
D. amendment

23. His book has a useful introduction.

A. end'
B. conclusion
C. termination
D. deduction

24. The criminal was detained by the police.

A. deterred
B. released
C. dismissed
D. protected

25. This offer has come as a great boon to me.

A. Curse
B. Blemish
C. Trouble
D. Misfortune

26. We received a cordial welcome from our host.

A. Indifferent
B. Distrustful
C. Cold
D. official

V. In each of the following questions, a sentence has been given in Active (or Passive) Voice. Out of the four alternatives suggested select the one which best expresses the same sentence in Passive (or Active) voice

27. His pocket has been picked.

A. They have his pocket picked.
B. Picking has been done to his pocket.
C. Picked has been his pocket.
D. Someone has picked his pocket.

28. My uncle promised me a present.

A. A present was promised by my uncle to me.
B. I was promised a present by my uncle.
C. I had been promised a present by my uncle.
D. I was promised by my uncle a present.

29. Who is creating this mess?

A. Who has created this mess?
B. By whom has this mess been created?
C. By whom this mess is being created?
D. By whom is this mess being created?

30. A lion may be helped even by a little mouse.

A. A little mouse may even help a lion.
B. Even a little mouse may help a lion.
C. A little mouse can even help a lion.
D. Even a little mouse ought to help a lion.

31. He was arrested on a charge of theft, but for lack of evidence he was released.

A. He was arrested on a charge of theft, but was released for lack of evidence.
B. The police arrested him on a charge of theft, but for the lack of evidence he was released.
C. The police arrested him on a charge of theft, but for the lack of evidence released him.
D. None of these.

VI. Please complete the sentences with suitable alternatives.

32. She expects that her son _____

A. can return
B. may return
C. should return
D. None of he above

33. All felt that he _____ a cheat.

A. may be
B. can be
C. might be
D. None of the above

34. She _____ alone as it was raining heavily.

A. must not leave
B. must not have left
C. should not leave
D. None of the above

35. You _____ obey your parents.

A. should
B. ought to
C. must
D. None of the above

36. Neena has a lot of stamina, she _____ dance all day and study all night.

A. should
B. was able to
C. can
D. None of the above

37. She advised that I _____ curtail expenditure on cosmetics.

A. Should
B. Shall
C. Should have
D. None of the above

38. He went there. so he _____ borrow money.

A. may
B. can
C. might
D. None of the above

39. I think the news _____ true.

A. may not be
B. should not be
C. could not be
D. None of the above

40. If we request her she _____ to college.

A. must give us lift
B. might give us lift
C. can give us lift
D. None of the above

GENERAL APTITUDE: (40 Questions)

I*: *Spot the Stranger

1. A) Abundance
   B) Plenty
   C) Sufficient
   D) Shortage

2. A) Wool
   B) Cotton
   C**) Terylene**
   D) Silk

3. A) Empty
   B) Occupied
   C) Unfilled
   D) Vacuum

4. 8, 26, 64, 125
   A) 12
   B) 26
   C) 64
   D) 125

5. 3, 9, 18, 20, 27, 36
   A) 9
   B) 27
   C) 20
   D) 36

II. Choose the most appropriate response to fill in the blanks

6. Scientist is to laboratory as Doctor is to _____

   A) Clinic
   B) Medicine
   C) Patient
   D) Disease

7. Work is to relax as obey is to _____
   A) Discipline
   B) Behave
   C) Disobey
   D) Quarrel

8. Maximum is to minimum as _____ is to stable

   A) Good
   B) Reasonable
   C) Fresh
   D) New

III. Choose the pair, the items of which bear the same relationship between them as the relationship between the items of the pair, given at the top of each question

9. Physics and Science

   A) Drawing and painting
   B) Sketching and printing
   C) Painting and art
   D) Medicine and doctor

10. Retreat and Defeat

    A) Charge and Advance
    B) Peace and Surrender
    C) Advance and victory
    D) Work and Success

11. Yarn and fabric

    A) Paper and book
    B) Wood and box
    C) Cloth and coat
    D) Pulp and paper

IV. Write the next number in the series

12. 9, 10, 8, 11, 7, 12, 6, 13, _____

    A) 4
    B) 5
    C) 13
    D) 6

13. 21, 28, 42, 63, _____

A) 92
B) 94
C) 95
D) 91

V. Choose the response which provides answer for the following

14. If 3*4=916, 2*5=425, 1*7=149 then 4*5=?

A. 232
B. 1625
C. 525
D. 1078

15. If 5*71=40, 92*23=55, 37*44= 80, then 54*32=?

A. 17
B. 54
C. 100
D. 45

VI. Choose the response that will continue the given series

16. 353, 464, 575, _____

A. 686
B. 764
C. 777
D. 796

17. 246, 357, 468, 579, _____

A. 759
B. 680
C. 678
D. 459

VII. Choose the most appropriate response

18. If the word 'STAND' is written in code as TSBMC, then how would you write 'SLEEP' in code?

A. MKODS
B. TKFFO
C. RGMMB
D. FFOTK

19. If JOEJB means 'India' ,then the last letter of the word got by decoding BSNZ is

A. W
B. X
C. Y
D. Z

20. If FLOWER is coded as UOLDVI, what is the word represented by the code NVIRG?

A. MERIT
B. NURIT
C. MIRUT
D. MARIT

21. The line demarcating the boundary between India and China is :

A. Durand line
B. Radcliffe line
C. Mc Mahon line
D. Strafford line

22. Zimbabwe was formerly known as

A. Zanzibar
B. Rhodesia
C. Bechuanaland
D. South West Africa

23. Which country is known as “Land of the Rising Sun”?

A. Japan
B. China
C. North Korea
D. Vietnam

24. Bauxite is an important ore for

A. Copper
B. Zinc
C. Iron
D. Aluminium

25. The brightest planet is

A. Venus
B. Mars
C. Mercury
D. Jupiter

26. Leh is situated on which river?

A. Jhelum
B. Indus
C. Chenab
D. Shravati

27. Imphal is the capital of

A. Tripura
B. Manipur
C. Mizoram
D. Nagaland

28. River Ganga, beyond Farakha, when it enters Bangladesh, known as

A. Meghana
B. Vana Ganga
C. Padma
D. Hooghly

29. The Indian Constitution was adopted and enacted by the Constituent Assembly of India (now the Lok Sabha and Rajya Sabha) on

A. 9th December 1946
B. 15th August 1947
C. 26th November 1949
D. 26th January 1950

30. The only land-locked and protected port in India is

A. Kolkata
B. Chennai
C. Paradip
D. Visakhapatnam

31. Where in India is the great one-horned rhinoceros found?

A. Kaziranga
B. Gir forests
C. Kanha
D. Dudwa

32. Which state in India has the highest literacy rate?

A. Andhra Pradesh
B. Telangana
C. Kerala
D. West Bengal

33. Kuchipudi is a famous dance form of

A. Karnataka
B. Andhra Pradesh
C. Assam
D. Uttar Pradesh

34. Which city in India is known as “Pink City”?

A. Jabalpur
B. Ladakh
C. Jaipur
D. Bengaluru

35. National Physical Laboratory is located in

A. Mumbai
B. New Delhi
C. Ahmedabad
D. Hyderabad

36. The river which flows between Vindhyas and Satpuras is

A. Narmada
B. Tapti
C. Chambal
D. Godavari

37. Agra is situated on the banks of which river?

A. Godavari
B. Gomati
C. Yamuna
D. Ganges

38. Which of the following is not a Union Territory?

A. Lakshadweep
B. Mizoram
C. Daman and Diu
D. Pondicherry

39. The oldest oil refinery in India is located at

A. Haldia
B. Barauni
C. Kochi
D. Digboi

40. Hirakud multipurpose project is on which river?

A. Mahanadi
B. Sutlej
C. Indus
D. Godavari

MATHEMATICS: (50 Questions)

1. If n is a positive integer , then n^3+2n is divisible by :

   A. 2
   B. 6
   C. 15
   D. 3

2. If $x+y=k$ is a normal to $y^2=12x$, then k=

   A. 3
   B. 6
   C. 9
   D. none of the above

3. The number of proper subsets of {1,2,3} is
   A. 8
   B. 7
   C. 6
   D. 5

4. A survey shows that 63% of the Americans like cheese and 76% like apples. If x% of the Americans like both cheese and apples , then
   A. x=39
   B. x=63
   C. $39 \leq x \leq 63$
   D. none of these

5. The conjugate of 1/ (2+i) is
   A. (2+i)/5
   B. (2-i)/5
   C. 5/ (2-i)
   D. 5/ (2+i)

6. If $x+x^{-1} = 2\cos(p)$ then x^n+x^{-n} =
   A. 2cos(np)
   B. 2sin(np)
   C. Cos(np)
   D. Sin(np)

7. What is the equation of a line passing through (0,1) and making an angle with the y-axis equal to the inclination of the line x-y=4 with the x-axis ?
   A. y=x+1
   B. x=y+1
   C. 2x=y+2
   D. none of the above

8. What is [[sin (a)/cosec (a)] + [cos (a)/sec (a)]] equal to?
   A. 2
   B. 1
   C. 0.5
   D. 0.4

9. What is the distance between the lines 3x+4y=9 and 6x+8y=18 ?
   A. 0
   B. 3 units
   C. 9 units
   D. 18 units

10. If a and b are the roots of the equation $2x^2 + 6x + b = 0$ (b<0) the [(a/b)+(b/a)] equals
   A. 2
   B. -2
   C. 18
   D. none of these

11. What is the solution set of the equation $x^4-26x^2+25=0$?
   A. {-5,-1, 1, 5}
   B. {-5,-1}
   C. {1, 5}
   D. {-5, 0, 1, 5}

12. If H is the harmonic mean between P and Q , then the value of ((H/P)+(H/Q)) is :
   A. PQ/(P+Q)
   B. (P+Q)/PQ
   C. 2
   D. none of these

13. The first, second and the middle terms of an A.P are a, b, c respectively. Then their sum is equal to:
   A. 2(c-a)/ (b-a)
   B. [2c(c-a)/ (b-a)] + c
   C. 2c(c-a)/ (b-a)
   D. none of these

14. The number of ways in which (m*n) students can be distributed equally among m sections is:
   A. $(m!)^n/n!$
   B. $(m!)^n/ (n!)^m$
   C. (m*n)! /m! n!
   D. $(m*n)^m$

15. The number of six digit numbers that can be formed from the digits 1,2,3,4,5,6,7 so that the digits do not repeat and the terminal digits are even is

A.144
B. 72
C. 288
D. 720

16. The number of divisors of the form $4n+2$ ($n \geq 0$) of the integer 240 is

A. 4
B. 10
C. 8
D. 9

17. Four couples (husband and wife) decide to form a committee of four members. The number of different committees that can be formed in which no couple finds a place is

A. 10
B. 12
C. 14
D. 16

18. If the second, third and fourth term in the expansion of $(x+a)^n$ are 240 , 720 and 1180 respectively, then the value of n is

A. 15
B. 20
C. 10
D. 5

19. The coefficient of x^4 in the expansion of $[(x/2)-(3/x^2)]^{10}$ is equal to

A. 405/256
B. 504/259
C. 2450/263
D. none of the above

20. The lines $px+qy+r=0$, $qx+ry+p=0$ and $rx+py+q=0$ are concurrent if

A. $pq+qr+rp=0$
B. $p^2+q^2+r^2=2pqr$
C. $p^3+q^3+r^3=3pqr$
D. none of these

21. The value of λ for which the system of equations $3x-y+4z=3$, $x+2y-3z=-2$, $6x+5y-\lambda z=-3$ has infinite number of solutions is

A. 5
B. -5
C. 0
D. -1

22. If $a^2+4b^2=12ab$, then log (a+2b) =
A. (log a + log b – log 2)/2
B. log (a/2) + log (b/2) + log 2
C. (log a +log b + 4log 2)/2
D. (log a – log b +4log 2)/2

23. The number $\log_2 7$ is
A. an integer
B. a rational
C. an irrational
D. a prime number.

24. Let A be a skew-symmetric matrix of an odd order. Then det(A) is equal to
A. 0
B. 1
C. -1
D. 2

25. If T is an identity matrix of order 3, then $T^2 + 2T$ is equal to
A. T
B. 2T
C. 3T
D. 4T

26. The range of the function f(x)=1/(2-cos (3x)) is equal to
A. [-1/3, 0]
B. R
C. [1/3, 1]
D. none of these

27. Which of the following functions is an even function?
A. $f(x) =\log(x+ (1+x^2)^{1/2})$
B. $f(x) = \log_e((1+x)/ (1-x))$
C. $f(x) = x ((a^x+1)/ (a^x-1))$
D. $f(x) = x\sin^2 x-x^3$

28. The value of lim $[(\sin(x) – x + x^3/6)/ x^5]$ as x tends to 0 is
A. 0
B. 1
C. 1/60
D. 1/120

29. If $y=\sin^n x \cos nx$ then dy/dx is equal to
A. $n \sin^{n-1} x \cos ((n+1) x)$
B. $n \sin^{n-1} x \sin ((n+1) x)$
C. $n \sin^{n-1} x \cos ((n-1) x)$
D. $n \sin^{n-1} x \cos (nx)$

30. If $x=a(\cos\theta + \theta\sin\theta)$ and $y=a(\sin\theta - \theta\cos\theta)$, then dy/dx is equal to
A. $\cos\theta$
B. $\tan\theta$
C. $\sec\theta$
D. $\text{cosec}\,\theta$

31. The value of k in order that $f(x)= \sin x - \cos x - kx + b$ decreases for all real values is given by :
A. $k<1$
B. $k>1$
C. $k>2^{1/2}$
D. $k<2^{1/2}$

32. The two curves $x^3 - 3xy^2 + 2 = 0$ and $3x^2y - y^3 = 2$,
A. cut at right angles
B. touch each other
C. cut at an angle $\pi/3$
D. cut at an angle $\pi/4$

33. A circular plate expands under the influence of heat so that its radius increases from 5cm to 5.06cm. The approximate increase in the area of the circular plate is:
A. 0.88cm^2
B. 1.88cm^2
C. 2.88cm^2
D. none of these

34. If $\int [2^x/((1-4^x)^{1/2})]\,dx = k\sin^{-1}(2^x) + C$ (C is an arbitrary constant) , then k =
A. log 2
B. 0.5 log 2
C. 0.5
D. 1/log 2

35. $\int (1-\cos x)\text{cosec}^2 x\,dx$ equals
A. $\tan(x/2) + C$
B. $\cot(x/2) + C$
C. $0.5\tan(x/2) + C$
D. $2\tan(x/2) + C$

36. The area bounded by the curve $y=2x-x^2$ and the straight line $y=-x$ is given by
A. 9/2
B. 43/6
C. 35/6
D. none of these

37. Area of the region bounded by the curve y=tan x , tangent drawn to the curve at x=$\prod/4$ and the x-axis is equal to
A. log ($\sqrt{2}$)
B. log ($\sqrt{2}$) + 0.25
C. log ($\sqrt{2}$) - 0.25
D. 0.25

38. Which of the following is the integrating factor of xlog x dy/dx + y = 2 log x ?
A. x
B. e^x
C. log x
D. log (log x)

39. The differential equation representing the family of curves $y^2=2c(x+c^{1/2})$ where c is a positive parameter, is of
A. order 1, degree 3
B. order 2, degree 2
C. order 3, degree 3
D. order 4, degree 4

40. The solution of the differential equation $(1+x^2)dy/dx + 1+y^2=0$ is
A. $\tan^{-1}x - \tan^{-1}y = \tan^{-1}c$
B. $\tan^{-1}y - \tan^{-1}x = \tan^{-1}c$
C. $\tan^{-1}x - \tan^{-1}y = \tan c$
D. $\tan^{-1}x + \tan^{-1}y = \tan^{-1}c$

41. The differential equation of a simple harmonic oscillator of period $2\prod/n$ is
A. $d^2x/dt^2 + nx =0$
B. $d^2x/dt^2 + n^2x =0$
C. $d^2x/dt^2 - n^2x =0$
D. $d^2x/dt^2 + x/n^2 =0$

42. The possible value of p for which the line $x\cos\varphi + y\sin\varphi = p$ is a tangent to the circle $x^2+y^2-2qx\cos\varphi - 2qy\sin\varphi = 0$ is / are:
A. 0 and q
B. q and 2q
C. 0 and 2q
D. q

43. If one end of the diameter of the circle $x^2+y^2-8x-4y+c=0$ is (-3,2), then the other end is
A. (5, 3)
B. (6, 2)
C. (1,-8)
D. (11, 2)

44. The line $y=mx+1$ is a tangent to the parabola $y^2=4x$ if
A. m=1
B. m=2
C. m=4
D. m=3

45. $x^2-4y^2-2x+16y-24=0$ represents :
A. a pair of straight lines
B. an ellipse
C. a hyperbola
D. a parabola

46. The eccentricity of the ellipse $9x^2+5y^2-30y=0$ is equal to
A. 1/3
B. 2/3
C. ¾
D. none of these

47. The points with position vectors $7i-4j+7k$, $i-6j+10k$, $-i-3j+4k$ and $5i-j+k$ form a :
A. square
B. rectangle
C. parallelogram
D. rhombus

48. One set containing 5 numbers has mean=8 and variance=24 and the second set containing 3 numbers has mean=8 and variance=24. The variance of the combined set is :
A. 42
B. 24
C. 20
D. 25

49. Bag A contains 2 white and 3 red balls and bag B contains 4 white and 5 red balls. One ball is drawn at random from one of the bags and it is found to be red. The probability that it is drawn from bag B is
A. 5/9
B. 4/9
C. 25/52
D. none of these

50. The probability that A can solve a problem is 2/3 and B can solve is ¾. If both attempt the problem, what is the probability that the problem gets solved?
A. 11/12
B. 7/12
C. 5/12
D. 9/12

PHYSICS: (50 Questions)

1. The capacity of a vessel is 5700m^3. The vessel is filled with water. Suppose that it takes 12 hours to drain the vessel, what is the mass flow rate (in kg/s) of water from the vessel? The density of water is 1g/cm^3 .

   A. 132 kg/s
   B. 100 kg/s
   C. 32 kg/s
   D. 152 kg/s

2. The expression for the centripetal force depends upon mass of the body, speed of the body and the radius of the circular path. Find the expression for the centripetal force.

   A. $F= mv^2/2r^3$
   B. $F= mv^2/r$
   C. $F= mv^2/r^2$
   D. $F= m^2v^2/2r$

3. A vector a makes an angle of 30 degrees and vector b makes an angle of 120 degrees with the x-axis. The magnitude of these vectors are 3 and 4 respectively. The magnitude of their resultant is

   A. 3 units
   B. 4 units
   C. 5 units
   D. 1 unit

4. The angle between the two vectors A=3i+2j+4k and B=2i+j-2k is equal to

   A. 180 degrees
   B. 90 degrees
   C. 0 degrees
   D. 240 degrees

5. Sound moves with higher velocity if
   A. Pressure of the medium is decreased
   B. Temperature of the medium is increased
   C. Humidity of the medium is increased
   D. Both B and C above

6. A particle moves along a straight line such that its position x at any time t is given by the equation $x=3t^2-t^3$, where x is in metre and t is in seconds. Then

   A. At t=0 , the acceleration is $6m/s^2$
   B. x-t curve has a maximum at 8m
   C. x-t curve has a maximum at 2s
   D. both A and C are correct

7. The motion of a body falling from rest in a resisting medium is described by the equation dv/dt = a-bv, where a and b are constants. The velocity at any time t is

   A. $a(1-b^{2t})$
   B. $[a(1-e^{-bt})]/b$
   C. abe^{-t}
   D. $ab^2(1-t)$

8. A particle is projected at an angle α with the horizontal from the foot of the inclined plane making an angle β with the horizontal. Which of the following expression holds good if the particle strikes the inclined plane normally?

   A. $\cot \beta = \tan(\alpha - \beta)$
   B. $\cot \beta = 2 \tan(\alpha - \beta)$
   C. $\cot \alpha = \tan(\alpha - \beta)$
   D. $\cot \alpha = 2 \tan(\alpha - \beta)$

9. A 0.1 kg body moves at a constant speed of 10 m/s. It is pushed by applying a constant force for 2 sec. Due to this force , it starts moving exactly in the opposite direction with a speed of 4m/s. Then ,

   A. The deceleration of the body is $7m/s^2$
   B. The magnitude of the change in momentum is 1.4 kg m/sec
   C. The impulse of the force is 1.4 Ns
   D. All the above

10. A 40N block is supported by two ropes. One rope is horizontal and the other makes an angle of 30 degrees with the ceiling. The tension in the rope attached to the ceiling is approximately equal to

    A. 80N
    B. 40N
    C. 34.6N
    D. 46.2N

11. Two buses A and B are moving around concentric circular paths of radii r_a and r_b. If the two buses complete circular paths in the same time , the ratio of the linear speeds is

    A. 1
    B. r_a/r_b
    C. r_b/r_a
    D. none of these

12. A point on the periphery of a rotating disc has its acceleration vector making an angle of 30 degrees with the velocity vector. The ratio of the centripetal acceleration to the tangential acceleration is equal to

    A. sin 30
    B. cos 30
    C. tan 30
    D. none of these

13. Which of the following is/are not conservative force?

    A. Gravitational force
    B. Electrostatic force in a columbic field
    C. Frictional force
    D. All the above

14. The potential energy of a particle of mass 5kg moving in the x-y plane is given by U= (-7x+24y) J. (x and y are in meter). If the particle starts from rest from the origin then the speed of the particle at t=2sec is

    A. 5 m/s
    B. 14 m/s
    C. 17.5 m/s
    D. 10 m/s

15. A stone is tied to a string of length L is whirled in a vertical circle with the other end of the string at the centre. At a certain instant of time, the stone is at its lowest position and has a speed U. The magnitude of the change in its velocity as it reaches a position where the string is horizontal is

    A. $\sqrt{(U^2-2gL)}$
    B. $\sqrt{(2gL)}$
    C. $\sqrt{(U^2-gL)}$
    D. $\sqrt{(2(U^2-gL))}$

16. If the momentum of a body is constant , the mass-velocity graph is

    A. Circle
    B. Straight line
    C. Rectangular hyperbola
    D. Parabola

17. A body is dropped and observed to bounce a height greater than the dropping height. Then

    A. The collision is elastic
    B. There is an additional source of energy during collision
    C. It is not possible
    D. This type of phenomenon does not occur in nature

18. The ratio of the radii of gyration of a circular disc and a circular ring of the same radii about the tangential axis in the plane is

    A. 1:2
    B. $5^{1/2}:6^{1/2}$
    C. 2:3
    D. 2:1

19. The gravitational force of attraction between two spherical bodies, each of mass 1 kg placed at 10 m apart ($G=6.67*10^{-11}\ Nm^2/kg^2$) is

    A. $6.67*10^{-13}$ N
    B. $6.67*10^{-11}$ N
    C. $6.67*10^{-7}$ N
    D. None of these

20. A particle executing simple harmonic motion has an amplitude of 1m and a time period of 2 seconds. At t=0, net force on the particle is 0. The equation of displacement of the particle is

    A. $X=\sin(\pi t)$
    B. $X=\cos(\pi t)$
    C. $X=\sin(2\pi t)$
    D. $X=\cos(2\pi t)$

21. A particle executes a simple harmonic motion. The amplitude of vibration of the particle is 2cm. The displacement of the particle in one time period is

A. 1cm
B. 2cm
C. 4cm
D. Zero

22. When equal volumes of two substances are mixed, the specific gravity of the mixture is 4. When equal weights of the same substances are mixed, the specific gravity of the mixture is 3. The specific gravity of the two substances would be

A. 6 and 2
B. 3 and 4
C. 2.5 and 3.5
D. 5 and 3

23. Bernoulli's principle is applicable to points

A. In a steadily flowing liquid
B. In a streamline
C. In a straight line perpendicular to a streamline
D. In any non-viscous liquid

24. The equation of a wave travelling on a stretched string along the x-axis is $y=ae^{-(bx+ct)}$. The direction of propagation of the wave is

A. Along negative y-axis
B. Along positive y-axis
C. Along negative x-axis
D. Along positive x-axis

25. If a stone is dropped into a lake from a tower, the sound of splash heard is by a man after 11.5s, then what is the height of the tower?

A. 1000m
B. 100m
C. 500m
D. 150m

26. The equation of a sound wave in air is P=0.01 cos (1000t – 3x), where P,x,t are in SI units. The bulk modulus of elasticity is $1.4*10^5$ N/m^2. The displacement amplitude is

A. 0.24m
B. $0.24*10^{-7}$ m
C. $8*10^{-7}$m
D. 10m

27. The temperature at which phase transition occurs depends on

A. Pressure
B. Volume
C. Density
D. Mass

28. Four gas molecules of a gas have speeds 1,2,3,4 km/s. The value of the root-mean square speed of the gas molecules is

A. $0.5*\sqrt{(15)}$ km/s
B. $0.5*\sqrt{(10)}$ km/s
C. 2.5 km/s
D. $\sqrt{(15/2)}$ km/s

29. What work will be done when 3 moles of an ideal gas is compressed to half the initial volume at a constant temperature of 300K?

A. -5188J
B. 5000J
C. 5188J
D. -5000J

30. A body at temperature of 727 degrees Celsius has a surface area of $5cm^2$, and radiates 300J of energy per minute. The emissivity e =? (Boltzmann constant = $5.67*10^{-8}$ watt m^2 K^4)

A. 0.18
B. 0.02
C. 0.2
D. 0.15

31. Find the position of a 1cm tall object which is placed 8cm in front of a concave mirror of radius of curvature 24cm

A. 24cm
B. 25cm
C. 26cm
D. 27cm

32. In Young's double slit experiment , when violet light of wavelength 435.8nm is used, then 84 fringes are seen in the field of view, but when sodium light of a certain wavelength is used, 62 fringes are seen in the field of view, calculate the wavelength of sodium light :

A. 689.3nm
B. 590.4nm
C. 552.3nm
D. 642.9nm

33. A point charge is projected along the axis of a circular ring of charge Q and radius $10\sqrt{2}$ m. The distance of the point charge from the centre of the ring, where the acceleration of the charged particle is maximum will be

A. 10cm
B. 20 cm
C. ∞
D. None of these

34. What should be the flux linked with the cube if a point charge q is placed at one corner of the cube?

A. q/ε_0
B. $q/2\varepsilon_0$
C. $q/3\varepsilon_0$
D. $q/8\varepsilon_0$

35. Over a thin ring of radius R a charge Q is distributed non-uniformly. Calculate the work done of the force field in displacing a point charge q_1 from centre of the ring to infinity :

A. $Qq_1/4\pi\varepsilon_0 R$
B. $Qq_1/2\pi\varepsilon_0 R$
C. $Qq_1/\pi\varepsilon_0 R$
D. None of these

36. The angle between the electric lines of force and an equipotential surface is

A. 45 degrees
B. 90 degrees
C. 0 degrees
D. 180 degrees

37. Two capacitors having capacitances 8μF and 16 μF having breaking voltages of 20V and 80V respectively. They are combined in series. The maximum charge they can store individually in the combination is

A. 1280 μC
B. 200 μC
C. 160 μC
D. None of these

38. Calculate the work done against the electric force if the separation of the capacitor of area S is increased from x_1 to x_2. Assume charge q on the capacitor is constant.

A. $W= q^2(x_2-x_1)/ \varepsilon_0 S$
B. $W= q(x_2-x_1)/ \varepsilon_0 S$
C. $W= q^2(x_2-x_1)/2\varepsilon_0 S$
D. $W= q^2(x_2-x_1)/4\varepsilon_0 S$

39. Two resistors of 6Ω and 9Ω are connected in series to a 120 V source. The power consumed by the 6 Ω resistor is:

A. 384 W
B. 576 W
C. 1500 W
D. 1800 W

40. The resistance of a 50cm long wire is 10 Ω. The wire is stretched to a uniform wire of length 100cm. The resistance will now be :

A. 15 Ω
B. 30 Ω
C. 20 Ω
D. 40 Ω

41. The earth's magnetic field at a certain point is 0.70 Gauss. This field is to be annulled by the magnetic field at the centre of a circular conducting loop 5 cm in radius. The requires current is about

A. 0.66A
B. 5.6A
C. 0.28A
D. 2.8A

42. The dimension of $1/\sqrt{(\mu_0\varepsilon_0)}$ is the same as

A. E/B
B. B/E
C. E^2/B^2
D. $\sqrt{(E/B)}$

43. Calculate the force acting between two magnets, placed in end on position 0.1 m apart from their centres. Given that the magnetic moment of each magnet is $5Am^2$

A. 0.6N
B. 0.8N
C. 0.15N
D. 0.2N

44. A bar magnet of magnetic moment 2.5 J/T is placed in a magnetic field of 0.2T. What amount of work is done in turning the magnet from parallel to antiparallel position relative to the field direction?

A. 1 J
B. 2 J
C. 3 J
D. 4 J

45. The magnetic flux φ (in weber) in a closed circuit of resistance 10Ω varies with time t (in seconds) according to the equation $\varphi=6t^2-5t+1$. The magnitude of induced current at t=0.25s is equal to

A. 1.2 A
B. 0.8 A
C. 0.6 A
D. 0.2 A

46. When the current changes from +2A to -2A in 0.05s, an emf of 8V is induced in a coil. The coefficient of self-induction of the coil is

A. 0.1 H
B. 0.2 H
C. 0.4 H
D. 0.8 H

47. An A.C source of voltage V=100 sin πt is connected to a resistor of resistance 20 Ω. The rms value of the current through the resistor is

A. 10 A
B. $10/\sqrt{2}$ A
C. $5/\sqrt{2}$ A
D. None of these

48. A radiation is incident on the metal surface of work function 2.3 eV. The wavelength of incident radiation is 600nm. If the total energy of the incident radiation is 23 J, then the number of photoelectrons is

A. Zero
B. $> 10^4$
C. $= 10^4$
D. None of these

49. If the radius of the first Bohr's orbit is x, then the de Broglie wavelength of electron in the 3rd orbit is nearly

A. 2πx
B. 6πx
C. 9x
D. x/3

50. In case of Compton effect, which of the following is applicable :

A. Energy conservation
B. Momentum conservation
C. Charge conservation
D. All the above

CHEMISTRY : (20 Questions)

1. If we take 44 gm. of CO_2 and 14 gm. of N_2 as a mixture, what is the mole fraction of CO_2 in the mixture?

   A. 1/5
   B. 1/3
   C. 2/3
   D. 1/4

2. According to Kinetic theory of gases, what will be the temperature when the rms velocity is 4 times of that at 300 K?

   A. 300 K
   B. 900 K
   C. 4800 K
   D. 1200 K

3. The enthalpy of vaporization of water is 186.5 J/mol. The entropy of vaporization is

   A. 0.5 $JK^{-1}mol^{-1}$
   B. 1.0 $JK^{-1}mol^{-1}$
   C. 1.5 $JK^{-1}mol^{-1}$
   D. 2.0 $JK^{-1}mol^{-1}$

4. If the solubility of Ag_2CrO_4 is S moles/litre , then its solubility product will be

   A. S^2
   B. S^3
   C. $4S^3$
   D. $2S^3$

5. The rate of the reaction becomes 4 times when the temperature is raised from 293 K to 313 K. The activation energy for such a reaction would be

   A. 50.855 $kJmol^{-1}$
   B. 52.849 $kJmol^{-1}$
   C. 54.855 $kJmol^{-1}$
   D. 56.855 $kJmol^{-1}$

6. The normality of 10% (weight/volume) acetic acid is

A. 1N
B. 10N
C. 1.66N
D. 0.83N

7. In the reaction : $3Br_2 + 6CO_3^{2-} + 3H_2O \rightarrow 5Br^- + BrO_3^- + 6HCO_3^-$

A. Bromine is oxidized and carbonate is reduced
B. Bromine is reduced and water is oxidized
C. Bromine is neither oxidized nor reduced
D. Bromine is both reduced and oxidized

8. A cell constituted by 2 electrodes A($E^0_{A/A+}$ = 0.35V) and B($E^0_{B/B+}$ = -0.42V) has the value of E^0_{cell} = ?

A. 0.07 V
B. 0.77 V
C. -0.77 V
D. -0.07 V

9. Only 1/8 th of the original amount of a radioactive element remains after 96 min. The value of $t_{1/2}$ of this element is

A. 12.0 min
B. 32.0 min
C. 24.0 min
D. 48.0 min

10. Octahedral molecular shape exists in _____ hybridization ?

A. sp^3d
B. sp^3d^3
C. sp^3d^2
D. None of these

11. Which of the following has the maximum number of unpaired electrons?

A. Mg^{2+}
B. Ti^{3+}
C. V^{3+}
D. Fe^{2+}

12. In the electrolytic process for the manufacture of NaOH from NaCl solution, the ion discharged at the anode is

A. OH^-
B. O^{2-}
C. Cl^-
D. All of these

13. IUPAC name of $K_3[Fe(CN)_6]$ is

A. Potassium ferricyanide
B. Potassium ferrocyanide
C. Potassium hexacyanoferrate(III)
D. Prussian blue

14. In P_4O_{10} the number of oxygen atoms bonded to each phosphorous atom is

A. 3
B. 5
C. 2
D. 4

15. Iron sheets are galvanized by

A. Tin plating
B. Zinc plating
C. Copper plating
D. Silver plating

16. A dark green bead in the borax bead test indicates the presence of

A. Cr^{3+}
B. Mn^{2+}
C. Co^{2+}
D. Ni^{2+}

17. The compound which gives the most stable carbonium ion on dehydration is

A. Isobutyl alcohol
B. Tert-butyl alcohol
C. N-butyl alcohol
D. Sec-butyl alcohol

18. Glycerol on treatment with excess HI gives

A. 1,2,3-triiodopropane
B. 1,3-diiodopropane
C. 2-iodopropane
D. 3-iodopropane

19. The wrong statement about Cannizaro reaction is

A. In Cannizaro reaction the oxidation number of carbon of -CHO increases as well as decreases
B. Cannizaro reaction is a disproportionation reaction
C. Cannizaro reaction is responded only by the first member of alkanal series
D. Non-α hydrogen containing aldehydes give Cannizaro reaction

20. Bakelite is made from phenol and formaldehyde. The initial reaction between them is

A. Electrophilic aromatic substitution
B. Nucleophilic aromatic substitution
C. Free radical reaction
D. Aldol reaction