MEGA COLLEGE
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Babarmahal, Kathmandu
MODEL QUESTIONS FOR ENTRANCE EXAMINATION

Stream: **Science**   Full Marks: 100
Time: 2:00 Hrs   Pass Marks: 40

Comprehension
Read the following Passages and choose the best answer for each question:
                                                                                [8 Marks]

Passage 1
Books are by far, the most lasting products of human effort. Temples crumple into ruin, pictures and statues decay, but books survive. Time does not destroy the great thoughts which are as fresh today as when they first passed through their author's mind. These thoughts speak to us through the printed page. The only effect of time has been to throw out of currency the bad products. Nothing in literature, which is not good, can live for long. Good books have always helped man in various spheres of life. No wonder that the world keeps its books with great care.

1. Of the products of human effort, books are the most
   a) enjoyable   b) useful   c) permanent   d) important
2. Time does not destroy books because they contain
   a)   high ideals   c) great ideas
   b)   useful material   d) subject-matter for education
3. "To throw out of currency" means
   a)   extinguish b) forget   c) destroy   d) put out of use
4. The world keeps its books with care because
   a)   they make us successful
   b)   they help us in various spheres of life
   c)   they bring great ideas to us   d) they educate us

Passage 2
In the past, man's worst enemy was nature. He lived under the continual threat of famine and pestilence. A wet summer could bring death to whole nations, and every winter was a menace. Mountains stood like a barrier between people, the sea was less a highway than an impassable division. Today nature, though still an enemy, is an enemy almost completely conquered. Modern transportation has made the resources of the entire planet accessible to all its inhabitants. Modern medicine and sanitation allow dense population to cover the ground without risk of pestilence. True, we are still at the mercy of the more violent natural convulsions against earthquakes, floods

and hurricanes. Man has, yet, devised no adequate protection. But these major cataclysms are rare. At most times, nature is no longer formidable, she has been subdued.

5. Modern medicine has helped man:
   a) live longer everywhere in the world
   b) live a healthy life in hygienic conditions
   c) live in thickly populated areas without fear of epidemics
   d) Balance population with available resources

6. Man has not yet succeeded in controlling the furies of
   a) Earthquake   b) floods   c) hurricanes   d) all of the above

7. Which one of the following statements best reflects the underlying conviction of the passage?
   a) Man does wonders
   b) Man's knowledge has no end
   c) Man has been able to control nature to a great extent
   d) Man has been able to control nature completely

8. In ancient times, man has an apprehension of
   a) epidemics   b) severe droughts   c) floods   d) all of the above

Grammar   **[12 Marks]**

9. Now a days every boy and girl .... own mobile.
   a) have/ their b) have/ his   c) have/ her   d) has/ their

10. More passengers than one … killed.
    a) has   b) was   c) were   d) have

11. " I 'm not well today," said Suresh (into indirect speech)
    a) Suresh told that he was not well today.
    b) Suresh said that he wasn't well today.
    c) Suresh said that he wasn't well that day.
    d) Suresh told me that he wasn't well today

12. He says, "Where shall I be this time next year?"
    a) He asks that where will he be this time next year.
    b) He wonders where he will be this time the next year.
    c) He thinks where shall he be this time the following year.
    d) He wonders where he will be this time the following year.

13. She made me sing.
    a) She was made sing.   c) By whom was she made sing?
    b) I was made to sing.   d) Both a and c.

14. They enjoyed a lot ….. Christmas.
    a) in   b) on   c) by   d) at

15. Her eyes are red. ....?
    a) Is she crying   c) Has she cried
    b) Did she cry   d) Has she been crying
16. I must not shout, ...?
    a) mustn't I   b) needn't I   c) shouldn't I   d) need I
17. My hair is as blond as ..... .
    a)   she   b) hers   c) her's   d) she's
18. Please, convey my best .... to your parents.
    a) complements   c) complimentary
    b) complementary   d) compliments
19. He went away because he could not put up with his colleagues. It means he
    could not.....
    a) tolerate   b) equal   c) understand   d) say not to
20. Restaurant: Menu, similarly
    a) library: catalogue   c) book: encyclopedia
    b) journal: newspaper   d) college: account

Science

21. Which of the following is a unit of energy?
    a)   watt   b) Newton   c) Watt ×day   d) Newton/m
22. A particle is thrown vertically upward with speed 100 m/s. The time to reach
    the body back on earth is
    a) 10 s   b) 20 s   c) 15 s   d) 5 s
23. Which of the following is a scalar quantity?
    a) electric current   b) acceleration   c) Force   d) electric field
24. Newton's second law of motion gives a measure of
    c) acceleration   b) force c) momentum   d) work
25. Inertia is the property by which the body is
    a) unable to change by itself the state of rest only
    b) unable to change by itself the state of uniform linear motion only
    c) unable to change by itself the direction of motion only
    d) unable to change by itself the state of rest and of uniform linear motion
26. A body is floating in a liquid. The upthrust on the body is
    a) equal to weight of liquid displaced
    b) less than the weight of liquid displaced
    c) weight of body minus weight of liquid displaced
    d) zero
27. The temperature of a patient is 40 ºC, his temperature on Fahrenheit scale will
    be
    a)   104 ºF   b) 102 ºF   c) 96   ºF   d) 103 ºF

28. The fastest mode of heat transfer is
    a) conduction   c) radiation
    b) convection   d) all of the above
29. A bomb explodes on the moon, you will hear its sound on earth after
    a) 10 min   b) 2 hours   c) 37 min   d) Never
30. Total internal reflection would take place if light passes
    a) from air to glass
    b) from water to glass
    c) from glass to air
    d) from air to water
31. The image of a nearer object formed by a long sighted person is
    a) at the retina   c) behind the retina
    b) in front of retina   d) no image is formed
32. The number of electrons in one coulomb of charge will be
    a) 5.46×10^{29} b) 6.25×10^{18} c) 1.6×10^{19} d) 6.02×10^{23}
33. Alternating current is the current which
    a) changes in magnitude only
    b) changes both in magnitude and direction
    c) changes in direction only
    d) neither changes in magnitude nor in direction
34. What is the smallest resistance that can be obtained by 2 Ω and 4 Ω resistors
    is
    a)   2 Ω b) 4 Ω c) $\frac{4}{3}\Omega$ d) **0**
35. An irreversible reaction, equilibrium is
    a) established quickly   b) established slowly
    c) never established   d) established when reaction stops
36. Which of the following is a Lewis base?
    a) BF_3 b) HCl   c) $AlCl_3$ d) F⁻
37. What is the color of phenolphthalein in acidic medium?
    a) red   b) orange   c) colorless   d) pink
38. Formic acid contains functional group:
    a) -OH   b) -COOH   c) -CHO   d) -CO
39. Which of the following is a heterocyclic compound?
    a) benzene   b) cyclohexane   c) cyclopentene   d) thiophene
40. Which of following reacts with concentrated alkaline $KMnO_4$ to produce
    oxalic acid?
    a) ethane b) ethene   c) ethyne   d) ethanol
41. Which of the following is used as domestic fuel?
    a) methane   b) ethyne   c) chloroform   d) ethanol
42. Plants converts glucose into:
    a) lipids   b) starch   c) proteins   d) aminoacids

43. Which of the following layers contains ozone gas?
   a) thermosphere   b) troposphere c) mesosphere   d) stratosphere
44. Most of air pollution is caused by:
   a) The burning of fossils fuels   b) Ozone   c) Acid rain   d) CO
45. Which of the following is not a waterborne disease?
   a) hepatitis   b) anemia   c) dysentery   d) typhoid
46. Which of the following is used as raw material for preparation of urea?
   a) CO_2 and $Ca(OH)_2$ c) H_2O and NH_3
   b) CO_2 and NH_3 d) NH_3 and NaCl
47. Nitrogen is less reactive than oxygen due to
   a) lower atomic number
   b) partially filled electronic configuration
   c) half-filled electronic configuration
   d) full-filled electronic configuration

48. Crossing over occurs at which stage of cell division?
   a) mitosis   b) meiosis I   c) meiosis II   d) metaphase
49. Which one has DNA   inside it?
   a) mitochondria   c) golgibody
   b) lysosome   d) cell membrane
50. Bacteriohage is a virus that is infective to-
   a) other viruses   b) algae   c) Protozoa   d) bacteria
51. When haemoglobin is combined with oxygen, the complex thus formed is called
   a) carboxyhaemoglobin   c) carbaminocompound
   b) haemoglobin oxide   d) oxyhaemoglobin
52. The valve situated between right auricle and right ventricle is called
   a) bicuspid valve   c) tricuspid valve
   b) aortic valve   d) semilunar valve
53. What is another name of RBC?
   a) thrombocytes   b) histocytes   c) erythrocytes   d) plasmocytes
54. Animals belonging to the phylum Porifera are first metazoan. Porifera are characterized by-
   a) water canal system   c) water vascular system
   b) no digestion   d) terrestrial habitat
55. The biological process carried out by the *Rhizobium* is called
   a) nitrification   c) ammonification
   b) de-nitrification   d) nitrogen fixation
56. One of the most essential features of birds which help in efficient flight is?
   a) feathers   c) only two legs
   b) presence of beak   d) pneumatic bones

57. The concept of survival of the fittest was given by-
    a) Linnaeus   b) Darwin   c) Hugo de Vries   d) Robert Hook
58. Inheritance of acquired characters' was elaborated by
    a) Lamarckism   b) Purkinje   c) Wallace   d) Darwin
59. The food chain starts with-
    a) nitrogen cycle   b) decay   c) photosynthesis   d) ATP
60. Which of the following agent is responsible for significant depletion of ozone layer?
    a) CO_2 b) CFC   c) SO_2 d) Methane

MATHEMATICS

61. If n (A) = 40, n (B) = 50, n(U) = 200 and n(A $\cap$ B) = 20 then
    n $\overline{(A \cup B)}$ =
    a) 20   b) 130   c) 40   d) 100
62. If f and g are two functions from R to R defined by $f(x) = 2x$ and $g(x) = x^2$
    Then (g0f) (x) =
    a) $2x^2$ b) $(4x)^2$ c) $4x^2$ d) $2x$
63. If $\vec{a} = 2\vec{i} + 4\vec{j}$ and $\vec{b} = \vec{i} + \vec{j}$ then $\vec{a}.\vec{b}$ = then
    a) 6   b) 5   c) 2   d) 0
64. If $0 < x < 1$ then which of the following is true?
    a) $x^2 > 1$ b) $x^2 < 1$ c) $x^2 = 1$ d) $x^2 = 0$
65. The formula used to calculate compound interest is
    a) $P[(1 + \frac{r}{100})^n - 1]$ c) $P[(1 + \frac{r}{100})^n + 1]$
    b) $[(1 + \frac{r}{100})^n - 1]$ d) $P[(1 - \frac{r}{100})^n + 1]$
66. A salary first increased by 10% then decreased by 10%. The total % change in his salary is
    a) 0%   b) 1% increased   c) 2% increased   d) 1% decreased
67. Supplementary angle of $30°$ is
    a) $120°$ b) $60°$ c) $90°$ d) $150°$
68. Opposite angle of cyclic quadi lateral are
    a) equal   c) complementary
    b) Supplementary   d) double of each other
69. The solution of : $2^x - 1 = 0$ is
    a) $x = 0$ b) x = 1   c) x < 1   d) x = -1
70. A $\cup$ B is
    a) { $x: x \in A$ and $x \in B$}   c) { $x: x \in A$ or $x \in B$}
    b) { $x: x \in A$ and $x \notin B$}   d) { $x: x \notin A$ and $x \notin B$}

71. Which of the following is not irrational?

   a) $2 - \sqrt{3}$ b) $2 + \sqrt{3}$ c) $(2 - \sqrt{3})(2 + \sqrt{3})$ d) $\sqrt{3}$

72. The Set A = {0, 1, 2, 3, 4,….} represent the set of

   a) whole number b) integers c) natural numbers   d) even numbers

73. The number π is

   a) natural number   b) rational number   c) irrational number d) integer

74. If one root of the quadratic polynomial $x^2 + 3x + k$ is 2 then the value o k is

   a) 10   b) -10   c) 5   d) -5

75. The roots of the quadratic equation $3x^2 - 48 = 0$ are

   a) both negative   c) one positive one negative
   b) both positive   d) both equal

76. The graph of x = -2 is a line parallel to the

   a) x -axis   c) y-axis
   b) both (a) and (c)   d) none of these

77. The value of $b^2 - 4ac$ for equation $3x^2 - 7x - 2 = 0$ is

   a) 49   b) 0   c) 25   d) 73

78. The equation $(x - 2)^2 + 1 = 2x - 3$ is …

   a) linear equation   c) cubic equation
   b) quadratic equation   d) bi-quadratic equation

79. Next term of AP $\sqrt{2}$, $3\sqrt{2}$, $5\sqrt{2}$,… is

   a) $2\sqrt{7}$ b) $6\sqrt{2}$ c) $9\sqrt{2}$ d) $7\sqrt{2}$

80. If P-1, P+3, 3P-1 are in A.P then P equal to

   a) 4   b) -4   c) 2   d) -2

81. 37th term of the AP: $\sqrt{x}$, $3\sqrt{x}$, $5\sqrt{x}$ … is

   a) $37\sqrt{x}$ b) $39\sqrt{x}$ c $73\sqrt{x}$ d) $75\sqrt{x}$

82. The distance of the point P (2, 3) from   x –axis   is

   a) 2   b) 3   c) 1   d) 5

83. The area of the triangle where vertex are A (1, 2), B (-2, 3) and C (-3, -4) is

   a) 11   b) 22   c) 33   d) 21

84. What is the maximum value of $\dfrac{1}{\cos ec A}$?

   a) 0   b) -1   c) 1   d) $\dfrac{1}{2}$

85. If $3\cot \theta = 2$ then the value of $\tan \theta$ is

   a) $\dfrac{2}{3}$ b) $\dfrac{3}{2}$ c) - $\dfrac{2}{3}$ d) 0

86. The functional value of $F(x) = x^2 - 2x + 1$ at $x = -1$ is:
   a) 1   b) 2   c) 4   d) -2

87. If $\cos(40^\circ + A) = \sin 30^\circ$, the value of A is
   a) 20° b) 30° c) 40° d) 10°

88. The tangents drawn at the extremities of the diameter of a circle are
   a) perpendicular   c) parallel
   b) equal   d) none of these

89. The area of the circle is 154 cm^2. The radius of the circle is
   a) 7 cm   b) 14 cm   c) 5.5 cm   d) 17.5 cm

90. The area of the circle that can be inscribed in a square of side 6 cm is:
   a) 18π cm^2 b) 12π cm^2 c) 9π cm^2 d) 14π cm^2

91. The surface area of a sphere is 616 cm^2. Its radius is
   a) 7 cm   b) 14 cm   c) 21 cm   d) 28 cm

92. Mode is the
   a) middle most frequent value   c) least frequent value
   b) maximum frequent value   d) none of these

93. The probability of getting at least one head in tossing a pair of coin is
   a) 0   b) 1   c) $\frac{3}{4}$ d) $\frac{1}{2}$

94. One card is drawn from a well shuffled deck of 52 cards. The probability of getting a king of red color is
   a) $\frac{1}{26}$ b) $\frac{7}{13}$ c) $\frac{1}{4}$ d) $\frac{1}{2}$

95. The probability of getting consonant from the word MAHIR is
   a) $\frac{2}{5}$ b) $\frac{3}{5}$ c) $\frac{4}{5}$ d) 1

WRITING

Healthy people are great assets to the country. Explain.   [5 Marks]

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