MDCAT PAST PAPER

SINDH MDCAT

ORIGINAL PAPER 2012

(DMC & SMC)

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ENGLISH

entify the word or phrase that needs to be changed for e sentence to be correct:

He brought down the tiger with his first shot. No error

The noise of the traffic make it impossible for us to work with the windows open. No error

omplete the sentences by choosing the most appropriate ord, from the given lettered choices (A to E) below each.

He got off his bicycle and _____ it through the gate.

A walked
B jumped
C wheeled
D tried
E repaired

Somebody has not turned the tap _____.

A of
B off
C over
D in
E at

Read the passage to answer questions 5-6

o inquire after the meaning or object of one's own existence or of reation generally, has always seemed to me absurd from an bjective point of view. And yet everybody has certain ideals which letermine the direction of his endeavors and his judgments. In this ense, I have never looked upon ease and happiness as ends in hemselves-such an ethical basis I call more proper for a herd of swine. The ideals which have lighted me on my way and time after ime given me new courage to face life cheerfully, have been Truth, Goodness, and Beauty. Without the sense of fellowship with men of ike mind, of preoccupation with the objective, the eternally unattainable in the field of art and scientific research, life would have seemed to me empty. The ordinary objects of human endeavor-property, outward success, luxury-have always seemed to me contemptible.

5. The author of the passage followed which of the following objectives?

I. Truth
II. Goodness
III. Beauty
IV. Saints

A. I Only
B. II Only
C. I & II Only
D. I, II & III Only
E. I, II, III, IV

6. Which of the following is contemptible for the author?

A. truth, goodness, and beauty
B. property, outward success, luxury
C. art and scientific research
D. sense of fellowship with men of like mind
E. preoccupation with the objective

Choose the word most similar in meaning to the capitalized one.

7. FREIGHT:

A worries
B luggage
C instruments
D foolish
E uneasy

8. HARDSHIP:

A wealth
B blessings
C gift
D suffering
E objections

Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

9. NEGLIGIBLE:

A. significant
B. untamed
C. tiny
D. casual
E. minute

10. ELEGANT:

A. graceful
B. unattractive
C. neat
D. appeasing
E. enchanting

PHYSICS

11. Identify the example/s of Static Equilibrium:

I. A book lying on a horizontal table
II. A building
III. A bridge

I only
II only
III only
II and III only
I, II and III

12. The mass of earth on the basis of Newton's Law of Gravitation is given by:

$M = 9.1 \times 10^{-31}\,kg$

$M = 1.6027 \times 10^{-27}\,kg$

$M = 5.98 \times 10^{24}\,kg$

$M = 6.02 \times 10^{23}\,kg$

$M = 3 \times 10^{3}\,kg$

13. Fusion and fission reactions are associated with:

Water or hydral energy
Geothermal energy
Fossil fuel energy
Nuclear energy
Tidal energy

14. What is the change in gravitational potential energy when 7000 N elevator moves from street level to the top of building 300 m above the street level?

2100 J
21000 J
210000 J
2.1×10^{6} J
210 J

15. A body of mass 0.025 kg attached to a spring is displaced through 0.1 m to the right of equilibrium position. If the spring constant is 0.4 N/m and its velocity at the end of displacement is 0.4 m/sec, then its total energy will be:

- 4×10^{-3} J
- 0.0002 J
- 0.000001 J
- 0.2 J
- 0.04 J

16. The unit of luminous intensity is _____.

- Mole
- Ampere
- Hertz
- Kelvin
- Candela

17. If $\vec{A} = 2\hat{i} + 3\hat{j} - \hat{k}$, $\vec{B} = 4\hat{i} + 2\hat{j} - 2\hat{k}$. Find a vector $\vec{x}$ parallel to $\vec{A}$ but has magnitude of $\vec{B}$?

- $\sqrt{\frac{12}{7}}(2\hat{i} + 3\hat{j}) - \hat{k}$
- $\sqrt{\frac{7}{12}}(4\hat{i} + 2\hat{j} - 2\hat{k})$
- $\sqrt{\frac{7}{12}}(2\hat{i} + 3\hat{j} + \hat{k})$
- $\sqrt{\frac{3}{5}}(\hat{i} + 2\hat{j} - 3\hat{k})$
- $\sqrt{\frac{5}{12}}(3\hat{i} + 5\hat{j} - 2\hat{k})$

18. If $\vec{A} = 3i + 6j - 2k$, then the unit vector parallel to $\vec{A}$ will be:

- $\frac{3i + 6j + 2k}{7}$
- $\frac{3}{7}\hat{i} + \frac{6}{7}\hat{j} - \frac{2}{7}\hat{k}$
- $\frac{3}{7}i + \frac{6}{7}j + \frac{2}{7}k$
- $\frac{7}{3i + 6j - 2k}$
- $\frac{7}{3i + 6j + 2k}$

19. If $\vec{V} = \lim_{\Delta t \to 0} \frac{\vec{r}}{\Delta t}$, then $\vec{V}$ will be:

- Average velocity
- Uniform velocity
- Instantaneous velocity
- Variable velocity
- None of the above

20. A ball is thrown vertically upward with the velocity of 98 m/sec, how high does the ball rise?

- 196 m
- 2 m
- 1/2 m
- 490 m
- 98 m

21. A particle is projected at an angle of 45° with a velocity of 9.8m/s. The horizontal range will be: ($g = 9.8\ m/s^2$)

- $\frac{9.8}{\sqrt{2}}m$
- $9.8\sqrt{2}m$
- 9.8 m
- 4.9 m
- 3.1 m

radian = _____ degrees.

- 360°
- 180°
- 100°
- 57.3°
- 0.01745°

$\vec{l} = \vec{r} \times \vec{p}$, and $\vec{r}$ = position vector, $\vec{p}$ = linear momentum then

in the equation will be:

- current
- length
- angular momentum
- torque
- displacement

he superposition of two light waves is called:

- Diffraction
- Polarization
- Interference
- Reflection
- Absorption

convex lens of focal length 20 cm, is used to form an erect image which is twice as large as the object, the position of the object will e _____ from the lens.

- 20 cm
- 5 cm
- 10 cm
- 30 cm
- 40 cm

system absorbs 1000 Joules of heat and delivers 600 Joules of work, while loosing 100 Joules of heat by conduction to the tmosphere, the change in the internal energy of the system will e:

- 600 Joules
- 900 Joules
- 300 Joules
- 400 Joules
- 1600 Joules

27. _____ is a device which makes use of mutual induction for stepping up or down an alternating e.m.f.

A. Sonometer
B. Transformer
C. Ammeter
D. Voltmeter
E. Potentiometer

28. In a circuit, there is a current of 5 amp which is changed such that the current falls to zero in 0.1 sec. If an average e.m.f. of 200 volts is induced, the self inductance of the circuit will be:

A. 4 henrys
B. 5 henrys
C. 6 henrys
D. 7 henrys
E. 8 henrys

29. The instrument(s) which work on the principle of Wheatstone bridge is/are:

A. Meter Bridge
B. The Post Office Box
C. Carey Foster's Bridge
D. Callendar
E. All of the above

30. An ammeter reads up to 1 A. Its internal resistance is 0.81 Ω. To increase the range to 10 A, the value of the required shunt is:

A. 0.3 Ω
B. 0.9 Ω
C. 0.09 Ω
D. 0.03 Ω
E. 1.3 Ω

31. Electromagnetic waves are produced by:

A. motion of electric and magnetic fields
B. chargeless particles
C. a static charge
D. heat
E. none of the above

32. The energy of an X-ray quantum of wavelength $1.0 \times 10^{-10} m$ is:

A. $1.99 \times 10^{-15} J$
B. $3 \times 10^{8} J$
C. $6.6 \times 10^{-34} J$
D. $19.89 \times 10^{-26} J$
E. 1.99 Joules

33. The shortest wavelength photon emitted in Balmer series is:

A. $1.0974 \times 10^{-7} m$
B. 4 nm
C. 364.6 nm
D. 3.64 m
E. 480 nm

34. To remove the huge amount of heat energy in nuclear reactor, _____ are used.

A. Core
B. Control rods
C. Shielding
D. Moderators
E. Coolants

35. The half life of C^{14} is about:

A. 1637 years
B. 892 years
C. 10 years
D. 100 years
E. 5730 years

36. The equation $\Delta U = \Delta Q$ refers to:

A. Isothermal process
B. Adiabatic process
C. Isochoric process
D. Isobaric process
E. Carnot cycle

37. Two capacitors $C_1 = 3\mu f$ and $C_2 = 6\mu f$ are in series across a 90 volts D.C supply. The total capacitance is given by:

$9\mu f$
$2\mu f$
$10\mu f$
$90\mu f$
$5\mu f$

38. Kinetic energy of a charged particle decreases by 10 J as it moves from a point at potential 100 V to 200 V. The charge on the particle is:

10^{-3} C
10^{-2} C
10^{-1} C
10^{5} C
10^{-9} C

39. A 100 watt bulb is operated by 240 volts, the current through the bulb will be:

2.4 A
240 A
0.416 A
41.6 A
416 A

40. A bulb having a resistance of 150Ω is connected to a 225 volt source, the current in the bulb will be:

1.5 A
10 A
3.7350 A
250 A
100 A

41. If the reaction

$$P + Q \rightarrow R + S$$

is described as being of zero order with respect to P, it means that:

P is a catalyst in this reaction
No P molecules possesses sufficient energy to react
The concentration of P does not change during the reaction
The rate of reaction is independent of the concentration of P
The rate of reaction is proportional to the concentration of Q

42. The number of moles of solute dissolved per liter of solution is called:

Normality
Molality
Molarity
Percentage composition
Mole fraction

43. The oxidation number of all the elements in free state is _____.

1
3
0
-1
-3

44. Sum of all the exponents of molar concentration of the reactant present in the rate equation is known as _____.

molecularity
order of reaction
rate of reaction
gradient
slope

45. According to _____ "the properties of elements are the periodic function of their atomic number".

Mendeleev's periodic law
Newland's law of octaves
Doberenier's triads
Lothar Meyer's classification
Modern periodic law

46. 2 grams of H_2 molecule contain _____ molecules.

12.04×10^{23}
6.02×10^{23}
3.01×10^{23}
1.008
2

47. Comparative rates of diffusion of He and SO_2 will be _____.

8
2
4
16
64

48. The unit of viscosity is _____.

Joule
N/m^2
dynes/cm
poises
ergs

49. The maximum possible number of electrons a shell 'n' can accommodate is given by

n
n^2
$2n^2$
n^3
$3n^2$

50. $Cl + \bar{e} \rightarrow Cl^- \quad \Delta H = -348kJ/mol$ the value -348KJ/mol in this case will be:

A. Ionization energy
B. Electronegativity
C. Electron affinity
D. Entropy
E. Free energy

51. Nitrogen dioxide decomposes on heating according to the following equation

$$2NO_2(g) \rightleftharpoons 2NO(g) + O_2(g)$$

When 4 mole of nitrogen dioxide were put into a 1 dm^3 container and heated to a constant temperature, the equilibrium mixture contained 0.8 mole of oxygen.

What is the numerical value of the equilibrium constant, K_c, at the temperature of the experiment?

A $\frac{0.8^2 \times 0.8}{4^2}$

B $\frac{1.6 \times 0.8}{2.4^2}$

C $\frac{1.6^2 \times 0.8}{4^2}$

D $\frac{1.6^2 \times 0.8}{2.4^2}$

E None of the above

52. H_2S is an example of _____ hydride.

ionic
covalent
complex
metallic
border-line hydride

53. The formula of "rock salt" is:

NaOH
$NaHCO_3$
Na_2CO_3
$CuSO_4$
NaCl

54. For the reaction, (where X is halogen)

$2M + X_2 \rightarrow 2MX$

If M is metal, it is more likely to be:

- Alkaline earth metal
- Alkali metal
- Outer transition metal
- Inner transition metal
- None of the above

55. Which one is not true for H_2SO_4?

- Acid
- Oxidizing agent
- Nitrating agent
- Dehydrating agent
- Sulphonating agent

56. Transition elements and their compounds are commonly used as catalysts due to _____.

- involvement of inner-d-orbitals
- due to the presence of unpaired electron
- d-d transition of electrons
- variable oxidation state
- suitable surface area

57. The C-C bond distance is _____.

- A 1.10 Å
- B 1.20 Å
- C 1.30 Å
- D 1.54 Å
- E 1.34 Å

58. $CH_3 - CH_2 - CH_2 - OH$ (1 propanol) and $CH_3 - \underset{\displaystyle OH}{\underset{|}{CH}} - CH_3$ (2, propanol)

are examples of _____.

- A Chain isomerism
- B Position isomerism
- C Functional group isomerism
- D Metamerism
- E. Optical isomerism

59. $CH \equiv CH + 2AgNO_3 \rightarrow AgC \equiv CAg + 2HNO_3$

represents _____ property of acetylene.

basic
acidic
dehydrating
physical
none of the above

60.  ($-NH_2$) on benzene ring is:

meta-directing and deactivating group
ortho-para directing and deactivating group
othro-para directing and activating group
orthro-directing and activating only
para-directing and deactivating only

61. The stability of carbonium ions follow the order:

$CH_3^+ > RCH_2^+ > R_2C^+H > R_3C^+$

$R_3C^+ > R_2CH^+ > RC^+H_2 > C^+H_3$

$R_3C^+ > CH_3^+ > R_2^+CH > R^+CH_2$

$R_2CH^+ > CH_3^+ > RCH_2^+ > R_3C^+$

$R_3C^- > R_2CH^- > CH_3^+ > RCH_2^+$

62. RMgX is an organometallic compound, generally known as:

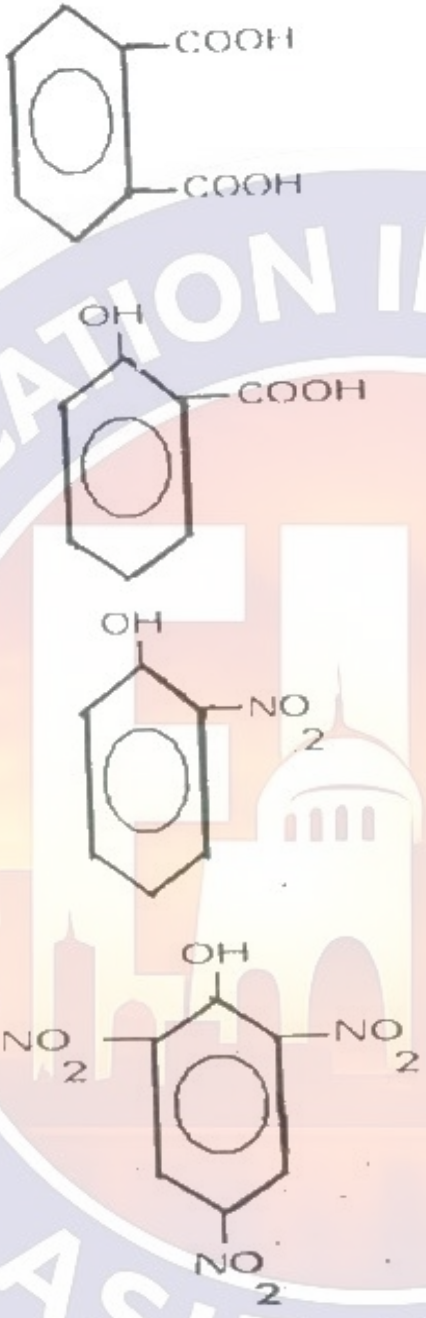
Grignard's Reagent
Baeyer's reagent
Ether
Ester
Aldehyde

63. _____ is used as preservative for life specimen.

H_2SO_4
Ammonia
Methanol
NaOH
Formalin

64. The structural formula of picric acid is:

$CH_3 - COOH$



65. _____ is needed in thyroxine, the hormone of thyroid gland.

- Mg^{++}
- K^{+1}
- Ca^{++}
- Iodine
- Zinc

66. SP^3 hybridization in CH_4 gives it _____ geometry.

Linear
Co planner
Tetra hedral
Trigonal pyramid
Octahedral

67. 1 calorie=_____ Joules.

200 Joules
2000 Joules
4.184 Joules
4180 Joules
3630 Joules

68. The amount of heat provided to a system at constant pressure (q_p) is equal to _____.

Change in internal energy (ΔE)
Change in enthalpy (ΔH)
Change in free energy (ΔG)
Change in temperature only (ΔT)
Change in pressure only (ΔP)

69. $AgCl \rightleftharpoons Ag^+ + Cl^-$

The k_{sp} for the reaction will be:

$$k_{sp} = \frac{[AgCl]}{[Ag^+][Cl^-]}$$

$$k_{sp} = \frac{[Ag^+][Cl^-]}{[AgCl]}$$

$$k_{sp} = [Ag^+][Cl^-]$$

$$k_{sp} = [AgCl]$$

$$k_{sp} = \frac{[Ag^+]}{[Cl^-]}$$

70. EDTA ion is a _____ legand.

Monodentate
Bidentate
Tridentate
Polydentate
None of the above

71. The secondary and tertiary consumers are also known as:

- green plants
- herbivores
- abiotic factors
- decomposers
- carnivores

72. Plants absorb it in the form of soluble phosphates. It is present abundantly in growing and storage organs of plants. What is it?

- H_2O
- CO_2
- K
- P
- N

73. Pharynx leads air into _____ through glottis.

- trachea
- bronchus
- alveoli
- nasal sac
- larynx

74. The concentration of Na ions in the body fluids is controlled by _____ harmone.

- ADH
- parathormone
- aldosterone
- estrogen
- thyroxin

75. The movement of plants in response to touch stimulus is called:

- hydrotropism
- chemotropism
- geotropism
- thigmotropism
- phototropism

76. The number of muscles in a human body is about:

- 200
- 300
- 400
- 500
- 600

.Steroids consist of _____ 6-membred carbon rings and one 5-membred carbon ring.

Four
Three
Two
Five
Six

.An enzyme increases the speed of a reaction:

by adding activation energy requirements
by lowering activation energy requirements
by decreasing the concentration of products
by increasing the concentration of products
all of the above

.Lysosomes are also called:

Suicide sacs
Chondriosome
Storage organelle
Dictyosome
Power house of a cell

.Closely related species are grouped together into _____.

families
orders
phyla
kingdom
genera

.The cell wall of most of the bacteria have unique macromolecule called _____.

cellulose
chitin
fibres
fats
peptidoglycan

.All of the following organisms belong to the kingdom protista EXCEPT:

Ulva
Euglena
Suctoria
Slime mold
Common Molds

83. Parasitic fungi absorbs nutrients directly from the living host with the help of special hyphal tips called _____.

Roots
Root hair
Rhizoids
Haustoria
None of the above

84. The botanical name of Imli is:

Cassia fistula
Mimosa pudica
Tamarindus indica
Datura alba
Rosa indica

85. Which one is not the group of Gymnosperm?

Cycads
Ginkgo
Gnetae
Conifers
Musci

86. Which one of the following is fish?

Star fish
Jelly fish
Cuttle fish
Sea horse
None of the above

87. $Glucose \rightarrow 2pyruvic\ acid + 2H_2O$

$2ADP + 2P_i \rightarrow 2ATP$

$2NAD + 4H \rightarrow 2NADH + 2H^+$

These three reactions collectively constitute _____.

Kreb's cycle
Calvin's cycle
Electron transport chain
Light reaction
Glycolysis

88. The genotype of normal male in humans is _____ chromosomes.

44+XX
44+XY
44+XXY
44+XO
44+XXX

89. The process of replacing **or supplementing** the defective allele with a functional, **normal allele is known** as _____.

allele transplant
physiotherapy
gene therapy
mutation
cloning

90. **Germ cells** give rise to:

legs
head
eggs and sperms
hands
all body parts

91. Cells from a bacterial clone were grown for many generations on a medium in which all the nitrogen compounds contained only the isotope nitrogen 15 (^{15}N). Adenine comprised 36% of the nitrogen bases present. A sample of these bacteria was transferred to a medium in which the only nitrogen source was ^{14}N and was provided with conditions suitable for asexual reproduction. What was the percentage of guanine in the DNA?

14%
18%
28%
36%
64%

92. Nitrogen-cycle is facilitated by _____.

Algae
Fungi
Bacteria
Virus
Earth-quacks

93. Savannah is an example of _____ ecosystem:

A marine water
B fresh water
C forest
D tropical grass land
E desert

94. In cats, the genes controlling coat-colour are co-dominant (incompletely dominant) and are carried on the X chromosomes. When a black female was mated with a ginger male the resulting litter consisted of black male and tortoise-shell female kittens. What phenotypic ratio would be expected in the F_2 generation?

A 1 black male: 1 ginger male: 2 tortoise-shell females
B 1 black male: 1 ginger male: 1 tortoise-shell female: 1 black female
C 2 black males: 1 tortoise-shell female: 1 ginger female
D 1 black male: 1 tortoise-shell female: 1 ginger female: 1 black female
E 2 black males: 1 tortoise-shell female: 1 black female

95. The region where the impulse moves from one neuron to another is called _____.

A Axon
B Dendrites
C Synapse
D Thalamus
E Cerebeilum

96. A bean seed contains all of the following except

A A seed coat
B An epicotyl
C A hypocotyl
D A hypha
E Cotyledon

97. _____ is the reconstruction of the lost part of the body.

A Growth
B Development
C Regeneration
D Blastulation
E Gastrulation

98. Fern has _____ pairs of chromosome.

23
40
500
13
7

99. Which valve action results from an increase in pressure in the ventricles of the heart?

A. The closing of all the heart valves
B. The closing of semi-lunar valves
C. The opening of the bicuspid valve
D. The opening of the semi-lunar valves
E. The opening of the tricuspid valve

100. The combination of XXY (47) chromosomes results in:

Down's Syndrome
Turner's Syndrome
Klinefelter's Syndrome
Sickle cell anemia
Color blindness

ANSWER KEY 2012 YELLOW

Question No	Correct Choice	Question No	Correct Choice
1	E	51	D
2	B	52	B
3	C	53	E
4	B	54	B
5	D	55	C
6	B	56	E
7	B	57	D
8	D	58	B
9	A	59	B
10	B	60	C
11	E	61	B
12	C	62	A
13	D	63	E
14	D	64	E
15	A	65	D
16	E	66	C
17	A	67	C
18	B	68	B
19	C	69	C
20	D	70	D
21	C	71	E
22	D	72	D
23	C	73	E
24	C	74	C
25	C	75	D
26	C	76	E
27	B	77	B
28	A	78	B
29	E	79	A
30	C	80	E
31	A	81	E
32	A	82	E
33	C	83	D
34	E	84	C
35	E	85	E
36	C	86	D
37	B	87	E
38	C	88	B
39	C	89	C
40	A	90	C
41	D	91	A
42	C	92	C
43	C	93	D
44	B	94	B
45	E	95	C
46	B	96	D
47	C	97	C
48	D	98	C
49	C	99	D
50	C	100	C