

MA - 2010

AI24BTECH11015 - Harshvardhan Patidar

LINKED ANSWER QUESTIONS

Statement for Linked Answer Questions 52 and 1:

For a differentiable function $f(x)$, the integral $\int_a^b f(x) dx$ is approximated by the formula $h[a_0f(0) + a_1f(h)] + h^2[b_0f'(0) + b_1f'(h)]$, which is exact for all polynomials of degree at most 3.

1) The values of a_0 and b_0 respectively are

- a) $\frac{1}{2}$ and $\frac{1}{2}$
- b) $\frac{1}{12}$ and $-\frac{1}{12}$
- c) $\frac{1}{2}$ and $\frac{1}{12}$
- d) $\frac{1}{2}$ and $-\frac{1}{12}$

Statement for Linked Answer Questions 2 and 3:

Let $X = C[0, 1]$ with the inner product $\langle x, y \rangle = \int_0^1 x(t)y(t) dt$, $x, y \in C[0, 1]$. $X_0 = \left\{ x \in X : \int_0^1 t^2 x(t) dt = 0 \right\}$, and X_0^\perp be the orthogonal complement of X_0 .

2) Which one of the following statements is correct?

- a) Both X_0 and X_0^\perp are complete
- b) Neither X_0 nor X_0^\perp is complete
- c) X_0 is complete but X_0^\perp is not complete
- d) X_0^\perp is complete but X_0 is not complete

3) Let $y(t) = t^3$, $t \in [0, 1]$ and $x_0 \in X_0^\perp$ be the best approximation of y . Then $x_0(t)$, $t \in [0, 1]$, is

- a) $\frac{4}{5}t^2$
- b) $\frac{3}{5}t^2$
- c) $\frac{6}{5}t^2$
- d) $\frac{7}{8}t^2$

GENERAL APTITUDE (GA) QUESTIONS

Q.4 - Q.8 carry one mark each.

4) Which of the following options is the closest in meaning to the word below:

Circuitous

- a) cyclic
- b) indirect
- c) confusing
- d) crooked

- 5) *The question below consists of a pair of related words followed by four pairs of words. Select the pair that best expresses the relation in the original pair.*

Unemployed : Worker

- a) fallow : land
 - b) unaware : sleeper
 - c) wit : jester
 - d) renovated : house
- 6) *Choose the most appropriate word from the options given below to complete the following sentence:*

If we manage to _____ our natural resources, we would leave a better planet for our children.

- a) uphold
 - b) restrain
 - c) cherish
 - d) conserve
- 7) *Choose the most appropriate word from the options given below to complete the following sentence:*

His rather casual remarks on politics _____ his lack of seriousness about the subject.

- a) masked
 - b) belied
 - c) betrayed
 - d) suppressed
- 8) 25 persons are in a room. 15 of them play hockey. 17 of them play football and 10 of them play both hockey and football. Then the number of persons playing neither hockey nor football is:
- a) 2
 - b) 17
 - c) 13
 - d) 3

Q.9 - Q.13 carry two marks each.

- 9) **Modern warfare has changed from large scale clashes of armies to suppression of civilian populations. Chemical agents that do their work silently appear to be suited to such warfare; and regretfully, there exist people in military establishments who think that chemical agents are useful tools for their cause.**

Which of the following statements best sums up the meaning of the above passage:

- a) Modern warfare has resulted in civil strife.
- b) Chemical agents are useful in modern warfare.
- c) Use of chemical agents in warfare would be undesirable.
- d) People in military establishments like to use chemical agents in war.

- 10) If $137 + 276 = 435$ how much is $731 + 672$?
- a) 534
 - b) 1403
 - c) 1623
 - d) 1513
- 11) 5 skilled workers can build a wall in 20 days; 8 semi-skilled workers can build a wall in 25 days; 10 unskilled workers can build a wall in 30 days. If a team has 2 skilled, 6 semi-skilled and 5 unskilled workers, how long will it take to build the wall?
- a) 20 days
 - b) 18 days
 - c) 16 days
 - d) 15 days
- 12) Given digits 2, 2, 3, 3, 3, 4, 4, 4, 4 how many distinct 4 digit numbers greater than 3000 can be formed?
- a) 50
 - b) 51
 - c) 52
 - d) 54
- 13) Hari (H), Gita (G), Irfan (I) and Saira (S) are siblings (i.e. brothers and sisters). All were born on 1st January. The age difference between any two successive siblings (that is born one after another) is less than 3 years. Given the following facts:
- a) Hari's age + Gita's age > Irfan's age + Saira's age.
 - b) The age difference between Gita and Saira is 1 year. However, Gita is not the oldest and Saira is not the youngest.
 - c) There are no twins.
- In what order were they born (oldest first)?
- a) HSI G
 - b) SGHI
 - c) IGSH
 - d) HSGI