

# MA - 2010

AI24BTECH11015 - Harshvardhan Patidar

## LINKED ANSWER QUESTIONS

*Statement for Linked Answer Questions ?? 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 1<sup>st</sup> 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