National Council of Science Museums
(Ministry of Culture, Govt. of India)
Block-GN, Sector-V, Bidhan Nagar
Kolkata – 700 091

Aptitude test for selection of Curator 'B'

Name of the Candidate ....

Form no. ....

Date of Aptitude Test: 12/09/2019
Time: 10:30 A.M.

Total Time: 3 Hours

INSTRUCTIONS FOR THE CANDIDATES

01. Please write your name and form number legibly in the spaces provided;

02. The test contains two sections; viz., **Section-'A'** and **Section-'B'**;

03. The duration of the test is 3 hours for both sections and maximum marks are 100;

04. Read the instructions provided with the questions carefully and answer;

05. In questions having multiple choice answers, please tick legibly on the test paper the answer of your choice;

06. In case you need to change your answer, strike out the wrong one legibly and put a tick in the answer of your choice;

07. If more than one answer is ticked, the answer shall be considered invalid and no marks will be awarded for the answer;

08. Carry out your rough work, if any, on the labeled sheet separately provided with this test paper;

09. No mobile phone will be allowed inside the examination hall;

10. There is no negative marking;

11. The complete question paper with labeled attached sheet should be handed over to the instructor before leaving the room;

12. Candidates will not be allowed to leave the examination hall before 2 hours;

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Question No. 1 to 30 carry 1 mark each. Tick the correct answer or fill in the blanks with correct alternatives as may be needed in the question.

1. V, W and X are intelligent; V,Y and Z are laborious; Y, X and Z are hones and V, W and Z are ambitious. Which of the following are not laborious?

   a. Y & Z   b. W & X   c. V & W   d. X & Y

2. Fill in the correct option -   UTS : FDC :: WVU : ?

   a. YWV   b. WXY   c. UVW   d. HGF

3. Statement: Should smoking be prohibited?
   Argument I.   Yes, it damages the liver and the lung.
   Argument II.   No, it will drive millions of tobacco workers out of factory.

   a. Only Argument I is strong.   b. Only argument II is strong.
   b. Both the arguments are strong   d. Neither I or II is strong

4. Fill in the correct preposition in the sentence: Trespassers are liable ….. a fine of Rs 500.00.
   a. to   b. for   c. with   d. into

5. The appropriate meaning of the idiom *" plays fast and loose"* is:
   a. very skillful player   b. says one thing and does another
   c. sternly opposed   d. quite worthless

6. Fill in the blank with correct option:

   We need much more proactive and …………….. supervision of dam waters while releasing in case of overflow to avoid a flood like situation.

   a. punctilious   b. scrupulous   c. diplomatic   d. conforming

7. A person who write the life story of a saint or of another person's life story with only praise and no criticism is called a ……………

   a. Chorographer   b. Pragiogrpaher   c. Hagiographer   d. Evangelographer

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8. The word to express 'a long and complicated process that is annoying and seems unnecessary" is:

   a. Legionnaire b. Rigmarole c. Roll mop d. Sacerdotal

9. A person whose natural body shape is thin is called:

   a. Mesomorph b. Endomorph c. Ectomorph d. Entromorph

10. What is the next in the series: 1ZV03X, 3XT11U, 5VR27T, 7TP51R, ...

    a. 9QM81O b. 9IM81L c. 9NR83P d. 9RN83P

11. If in a secret code DELHI is written as 1817101413, how can NOIDA be written in the same code?

    a. 0708141821 b. 0807131821 c. 1807131822 d. 0807131826

12. India is the largest producer of several food grains. Find the odd man out.

    a. Jute b. Ginger c. Onion d. Banana

13. Every year 12th August is celebrated as International Youth Day. The theme of 2019 International Youth day was:

    a. Transforming the Nation b. Transforming Education
    c. Transforming Sports d. Youth Skill and Innovation

14. One of the country below is not a member of Visegrád group or V4 group of countries in central Europe. Identify the country.

    a. Poland b. Czech Republic c. Hungary d. Austria

15. The world is celebrating 150 years of one of the following event. Identify it.

    a. Birth Anniversary Acharya P C Ray b. Birth Anniversary of Einstein
    c. Periodic Table of Chemical elements d. Discovery of Radioactivity

16. National Technology Day is celebrated in India on …………………..

    a. 5th May   b. 28th February   c. 11th May   d. 21st April

17. In a secret artificial language:
daftafoni means advisement; *imodafta* means misadvise; *imolokti* means misconduct
Which word could mean "statement"?

    a. *kratafoni*   b. *kratadafta*   c. *loktifoni*   d. *daftaimo*

18. Chandrayaan 1 mission of ISRO which confirmed presence of water molecule on Moon's surface was launched in the year……

    a. 2009   b. 2008   c. 2010   d. 2007

19. The name of the lander, which has been sent by ISRO with the Chandrayaan 2 and which will land at South pole of moon is …………..

    a. Vishal   b. Vikrant   c. Vikram   d. Pragyan

20. The Council of Scientific & Industrial Research (CSIR), known for its cutting edge R&D knowledgebase in diverse S&T areas, has a dynamic network of …………………….. national laboratories.

    a. 39   b. 42   c. 40   d. 38

21. Government of India scheme of FAME is related to which of the following industry:

    a. Electronics b. Mobile phones c. Electric and hybrid vehicles d. AI, AR & VR

22. The number of elected members in the Upper House of Parliament in India is ……………...

    a. 250   b. 543   c. 238   d. 545

23. Who is the current Principal Scientific Advisor to the Government of India?

    a. Dr. R. Chidambaram   b. Dr. Anil Kakodkar

    c. Prof. K VijayRaghavan   d. Dr. V.S. Saraswat

24. The large scale physics experiment observatory called LIGO is meant to detect ....Radioisotopes which are used in medical diagnosis are known as:

   a. Radioisotopes in Earth's core
   b. Cosmic Gravitational waves
   c. Elements ejected during Solar flare
   d. Magnetic materials in Space

25. The AAYUSH system of medical practice in India consists of several traditional medicine practices. Find the odd man out?

   a. Yoga
   b. Unani
   c. Ayurveda
   d. Accupuncture

26. Here are two statements about the roots of the equation $x^2 - 8x + 12 = 0$.
   (i)   The roots are real and rational;   (ii)   The roots are equal
          Which of the following is true?

   a. Neither statement is correct
   b. Only statement (i) is correct
   c. Only statement (ii) is correct
   d. Both statements are correct

27. As of now, the total number of states & UTs respectively in India is :

   a. 29 & 7   b. 28 & 9   c. 30 & 6   d. 29 & 9

28. In 2019, DRDO tested its ballistic missile defence interceptor system called ASAT. The name of the mission was:

   a. LAKSHYA   b. NAGA   c. SHAKTI   d. VEDHA

29. Choose the best option which completes the sequence:
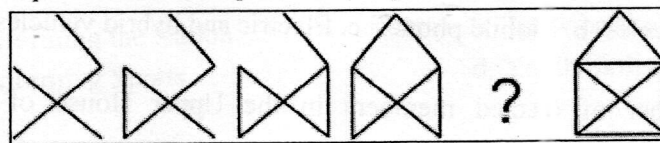
   a.   b.   c.   d.

30. India is not a member of which group of countries?

   a. G 7   b. G 20   c. G 5   d. G 4

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Section (B).

C-S.

Part-A

(2 marks for each question)

1. Who was the originator of MS-DOS

   (a) Gary Kildall   (b) Tim Paterson   (c) Dannis Ritchie   (d) Ken Thompson

2. The probability of an event **B** occurring is **P**. The probability that events **A** and **B** occur together is **Q**. The probability that **A** occurs, without **B** occurring is **R**. Then the probability of **A** occurring is

   (a) P + Q + R   (b) P + Q -R   (c) Q + R   (d) P- Q- R

3. Recently, scientists observed the merger of giant 'blackholes' billions of light-years away from the Earth. What is the significance of this observation?

   (a) 'Higgs boson particles' were detected.

   (b) 'Gravitational waves' were detected.

   (e) Possibility of inter-galactic space travel through 'wormhole' was confirmed.

   (d) It enabled the scientists to understand 'singularity'.

4. In 8086 microprocessor the address bus is of _____ bits.

   (a) 16   (b) 32   (c) 20   (d) 8

5. Give Postfix form for A + [(B + C) + (D + E) * F] / G

   (a) ABC + DE + F * + G / +

   (b) ABC + DF + E * + G / +

   (c) ABC + DE + F * + G +/

   (d) AB+C + DE ++ F * G / +

6. Which of the following pairs of regular expression are not equivalent?

   (a) 1(01)*   and   (10)*1

   (b) z(zz)*   and   (zz)*z

   (c) b*   and   b*b+

   (d) (ab)*   and   a*b*

7. Any String of terminals that can be generated by the following CFG

$$S \rightarrow XY$$

$$X \rightarrow aX \mid bX \mid a$$

$$Y \rightarrow Ya \mid Yb \mid a$$

(a) Has at least one b

(b) should end in an 'ab'

(c) has no consecutive a's or b's

(d) has at least two a's

8. Given two sorted list of size 'p' and 'm' respectively. The number of comparison needed in the worst case by the merge sort algorithm will be

(a) p X m

(b) Maximum of p, m

(c) Minimum of p, m

(d) p+m-1

9. A machine needs a minimum of 100 sec to sort 1000 names by quick sort. The minimum time needed to sort 100 names will be approximately

(a) 11.2 sec

(b) 10 sec

(c) 6.7 sec

(d) 5 sec

10. A graphic display system has a frame buffer that is 800 pixel wide, 600 pixel high and 8 bit of colour depth. If the access time for each pixel on the average is 10 nanoseconds, then the refresh rate of the frame buffer is approximately:

(a) 30 frames per second

(b) 20 frames per second

(c) 26 frames per second

(d) 208 frames per second

11. Which of the following statements is/are True regarding the solution to the visibility problem in 3D graphics?

S1: The Painter's algorithm sorts polygons by depth and then paints (scan –converts) each Polygon on to the screen starting with the most nearest polygon.

S2: Blackface Culling refers to eliminating geometry with blackfacing normal.

(a) S1 only

(b) S2 only

(c) Both S1 and S2

(d) Neither S1 nor S2

12. If a file consisting of 60,000 characters takes 50 seconds to send, the data rate is _____.

   (a) 1 Kbps   (b) 1.25 Kbps   (c) 10 kbps   (d) 9.6 kbps

13. Match the following:

List – I	List – II	
(a) Data Link Layer	(i)	Encryption
(b) Network Layer	(ii)	Connection control
(c) Transport layer	(iii)	Routing
(d) Presentation Layer	(iv)	framing

	(a)	(b)	(c)	(d)
(1)	(iv)	(iii)	(ii)	(i)
(2)	(iii)	(iv)	(ii)	(i)
(3)	(iv)	(i)	(ii)	(iii)
(4)	(iv)	(iii)	(i)	(ii)

14. Consider the following statements in the context of digital technologies for entertainment:

   (1) Augmented Reality (AR) allows individuals to be present in the world and improves the experience using the camera of smart-phone or PC

   (2) In AR, a simulated environment is created and the physical world is completely shut out.

   (3) Virtual Reality (VR) closes the world, and transposes an individual, providing complete immersion experience.
   (4) In VR, images generated from a computer are projected onto real-life objects or surroundings.

   Which of the statements given above is/are correct?

        (a) 2 and 4 only
        (b) 3 only
        (c) 3 and 4
        (d) 1 and 3

15. A digital signature is

   1. an electronic method of signing an electronic document and ensuring that the original content is unchanged
   2. Used to serve as a proof of identity of an individual to access information or server on Internet

   3. an electronic record that identifies the certifying authority issuing it

   Which of the statements given above is/are correct?

        (a) 1 only   (b) 2 and 3 only

        (c) 1, 2 and 3   (d) 3 only

Part-B (Descriptive Type Question)

Question 1: An art or science museum is trying to enrich its galleries with digital technologies and has a target to introduce immersive and interactive exhibits in the museum. Write a concept paper on various technologies you want to introduce in the museum with all the technical details about the hardware and software requirements mentioning about the know-how of at least two technologies.

(15 marks)

Question 2: What is Relational Database? List and describe briefly all the possible application of a database management in a Museum?

Consider the following schema:

Bidders (*bid:* **integer**, *bname:* **string**, *address:* **string**, *turnover:* **integer**)

Items (*itemid:* **integer**, *item_name:* **string**, *item_color:* **string**)

Tender_bid (*bid:* **integer**, *itemid:* **integer**, *cost:* **real**)

The key fields are underlined, and the domain of each field is listed after the field name. Therefore, *bid* is the key for Bidders, *itemid* is the key for Items, and *bid* and *itemid* together form the key for Tender_bid. The Tender_bid relation lists the prices charged for Items by Bidders. Write the following queries in SQL:

(a) Find the *bids* of bidders who supply some red or green item.
(b) Find the *bids* of bidders who supply some red item or are at Kolkata India.
(c) Retrieve all bidders whose turnover is between £ 300000 and £ 500000 and Address is in Kolkata.
(d) Retrieve the total number of bidders whose turnover is more that £50000.
(e) Insert the values 001, XYZ, ABC Road, 300000 in the Bidders table.

(2+3+2*5) marks

Question 3: Define Object Oriented Programming (OOP)? What are the main features of OOP? Write a program in C that will print out all the rotations of a string typed into it. For example, the rotations of the word "PEAR" are:

PEAR	EARP	ARPE	RPEA

(2+3+5) marks