Centre for Atmospheric Sciences
IIT Delhi

Written Test for selection of Senior Laboratory Assistants

Total Marks – 70

Date: 29.11.2019

Venue: LH 308

Time – 10:00 AM-12:00 Noon

Instructions:

General: The examination to select 3 SLAs at CAS, IIT Delhi will take place in two stages – "Written" (Stage I) and "Practical" (Stage II). Only those candidates who will score more than or equal to 60% marks (relaxed to 55% for SC and ST candidates) out of 70 in the "Written Test", will be selected for Stage II (Practical exam) in the afternoon of 29.11.2019.

The candidate has to score more than or equal to a minimum qualifying '60% marks' (relaxed to 55% for SC and ST candidates) out of 30 in the "Practical exam" to be included in the merit list.

Final merit list will be prepared based on the combined marks obtained in the 'Written" and "Practical" examinations of the qualifying candidates.

Specific for the "Written Exam": This written test has three sections - A, B and C. Answer all questions from all the sections. There is no 'negative' marking. Use either 'blue' or 'black' pen only.

Each multiple choice question (MCQ) except one (Question 16 on page 6) has four answers, out of which one is correct. Mark the correct answer in the answer sheet with a "cross" as demonstrated below. Any other way of answering and any over-writing will not be marked.

Four answer choices: [A] [B] [C] [D]

If the correct answer is B: [A] [B] [C] [D]

Name: _____

Application Number: _____

Signature: _____

Section A: English language and communication (20 Marks)

Select the best option to fill in the blank. **[Marks 1 × 5 = 5]**

1. I _____ anything since breakfast so I feel very hungry now.

(A) eating (B) haven't eaten (C) don't eat (D) didn't eat

Answer: A B C D

2. I _____ cricket yesterday.

(A) will play (B) played (C) play (D) playing

Answer: A B C D

3. It rained many times last week, but this week it _____ once.

(A) isn't raining (B) haven't rained (C) hasn't rained (D) rain

Answer: A B C D

4. The teacher knows all the _____ names.

(A) student (B) students (C) students' (D) student's

Answer: A B C D

5. Our plan _____ by the Director.

(A) approved (B) not approved (C) was approved (D) has approved

Answer: A B C D

Choose the correct answer. **[Marks 1 × 5 = 5]**

6. What did you do last Sunday?

(A) I'm going to the mall.
(B) I slept all day.
(C) I'll go to the cinema.
(D) It was hot.

Answer: A B C D

7. When will you send that email?

(A) Yesterday. (B) After lunch. (C) I'll send it. (D) To the Director.

Answer: A B C D

8. Which one of the following sentences is correct?

(A) I think they're going to the mall to buy their clothes there.
(B) I think their going to the mall to buy their clothes they're.
(C) I think they're going to the mall to buy there clothes their.
(D) I think there going to the mall to buy they're clothes their.

Answer: A B C D

9. Which one of the following sentences is correct?

(A) The best colleges are in Kolkata Delhi and Mumbai.
(B) The best colleges are in Kolkata, Delhi, and Mumbai.
(C) The best colleges are in Kolkata; Delhi; and Mumbai.
(D) The best colleges are in Kolkata and Delhi and Mumbai.

Answer: A B C D

10. Which one of the following sentences is correct?

(A) I found out that he was guilty.
(B) Much pains has been taken.
(C) The emails was written quickly.
(D) Neither of the men was tall.

Answer: A B C D

Read the passage and answer the questions. **[Marks 1 × 5 = 5]**

With an aim to improve weather forecasting in the country, the government will procure two more supercomputers whose combined computing powers would be eight times the existing capacity, a top ministry official said Sunday. Ministry of Earth Sciences (MoES) Secretary M. Rajeevan said plans are afoot to buy these supercomputers, with a combined total computing speed of 80 petaflops, at a cost of approximately Rs. 1500 crore. The MoES currently has two supercomputers - one at the National Centre for Medium Range Weather Forecast (NCMRWF), Noida, and the other at Indian Institute of Tropical Meteorology, Pune - with a combined capacity of 10 petaflops. Union Minister for Earth Sciences Harsh Vardhan was also briefed about the priority procurement after he took charge of the ministry for a second time last week, the secretary said. The new supercomputers will be set up at the two existing institutes of the MoES, Rajeevan said. He said the ministry has formed a panel of experts to assess whether to buy two supercomputers of 40 petaflops capacity each or two units of 60 petaflops and 20 petaflops each.

"We have been improving our weather forecasting. We are currently giving weather forecast with a resolution of 12 kilometres. We plan to take it to 5 kilometres for district and block level forecast and we need such high-level computing for that", said a ministry official. The effects of improvement in weather forecasts are already visible: the death tolls from cyclones and other extreme weather events have significantly come down in the recent years. The fine resolution forecasts will be a lifesaver for farmers looking for guidance on when to sow, irrigate and harvest their crops. Supercomputers are used to compute data related to weather forecasting and running different weather and climate models. They also play a critical role in computing data for monsoon and extreme weather event and are also used by other institutes of the MoES such as the India Meteorological Department.

11. Choose the most appropriate title for the above passage.

(A) Supercomputers improve global warming.
(B) New supercomputers for weather forecasting.
(C) Weather forecasting at state level.
(D) Weather forecasts need improvement.

Answer: A B C D

12. What is the meaning of 'afoot' as used in the passage?

(A) A short distance (more than an inch but less than a mile).
(B) Leg.
(C) In progress.
(D) Complete.

Answer: A B C D

13. Why does MoES need new supercomputers?

(A) To compute data related to weather forecasting.
(B) To compute data for monsoon and extreme weather events.
(C) To provide district and block level forecasts.
(D) To give them to the India Meteorological Department.

Answer: A B C D

14. After the new supercomputers are procured, what will be the supercomputing capacity of MoES?

(A) 10 Petaflops.
(B) 60 Petaflops.
(C) 80 Petaflops.
(D) 90 Petaflops.

Answer: A B C D

15. According to the passage, which one of the following professions has benefitted from improved weather forecasts?

(A) School teachers.
(B) Coal miners.
(C) Farmers.
(D) Factory workers.

Answer: A B C D

16. **Email writing:**

[Marks 5]

A vendor has been awarded the contract to supply new batteries for our UPS. However, we have not received the batteries yet. Write an email (in the space below) to the vendor in 50-60 words complaining about the delay and demanding an immediate solution.

Section B: Quantitative and logical skills **[Marks 1 × 20 = 20]**

17. Find the missing sequence: A, A, B, C, E, _____

(A) F (B) G (C) H (D) L

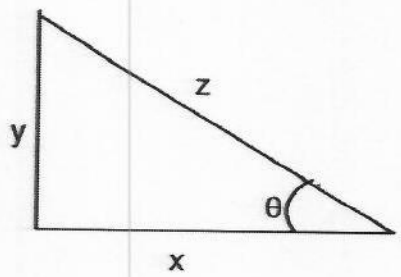
Answer: A B C D

18. A retailer has bought watches and initially increased its price by 20%, but due to lack of sales he reduced 10% from the new price. If he sold the watch at Rs. 1080 per piece, then what is his original buying price?

(A) 1000 (B) 1100 (C) 1200 (D) 900

Answer: A B C D

19. In the given triangle below if $y = \frac{z}{2}$, what is the angle θ?

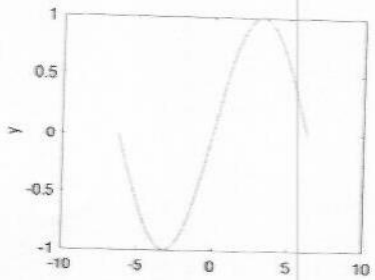


(A) 30° (B) 45° (C) 60° (D) 70°

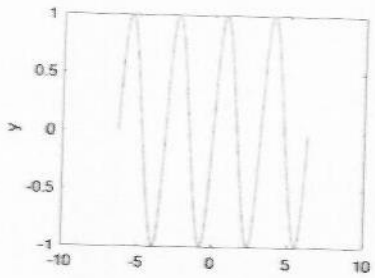
Answer: A B C D

20. Which of the below represent y = sin 2x with the interval ($-2\pi<x<2\pi$)?

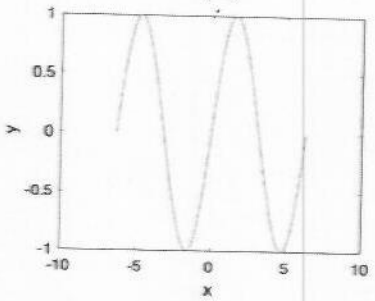
(A)



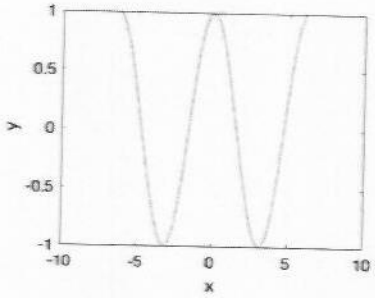
(B)



(C)



(D)



Answer: A B C D

21. Which one of the following is a true value of y in $\frac{1}{y}+\frac{3y}{4}+\frac{y}{2}=y+1$?

(A) 3 (B) 2 (C) 1 (D) 4

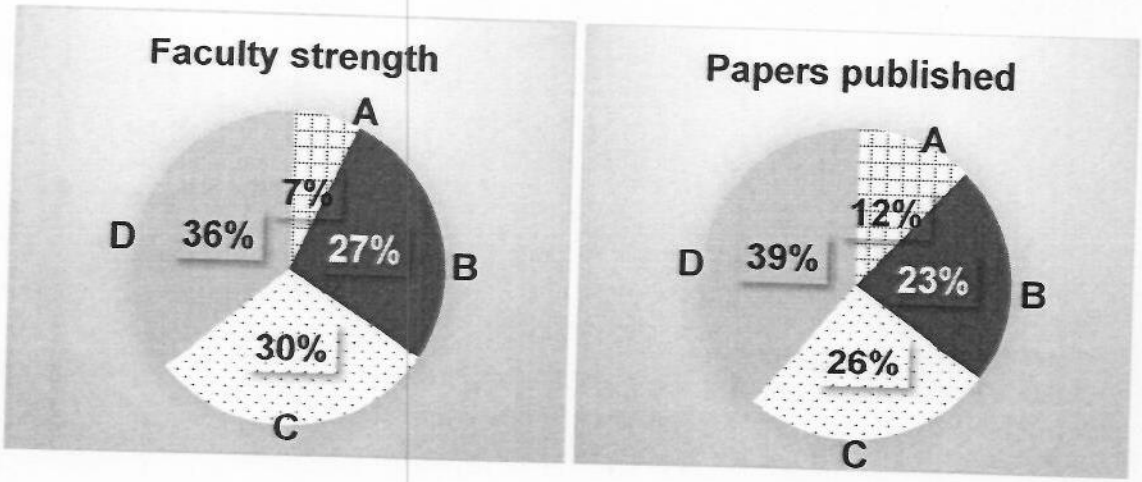
Answer: A B C D

22. A loan of Rs. 1,00,000 is issued at a compound interest rate of 10% per annum. If the loan is to be repaid in 3 years, what will be the net interest amount?

(A) 33,100 (B) 1,33,300 (C) 45,000 (D) 30,000

Answer: A B C D

23. The given pie charts depict distributions of the faculty strength and the papers published by the faculty of four academic units respectively. Which of the following is true?



(A) Academic unit A published a greater number of papers per faculty than other academic units.
(B) Academic unit B published a greater number of papers per faculty than other academic units.
(C) Academic unit C published a greater number of papers per faculty than other academic units.
(D) All the academic units published similar number of papers per faculty.

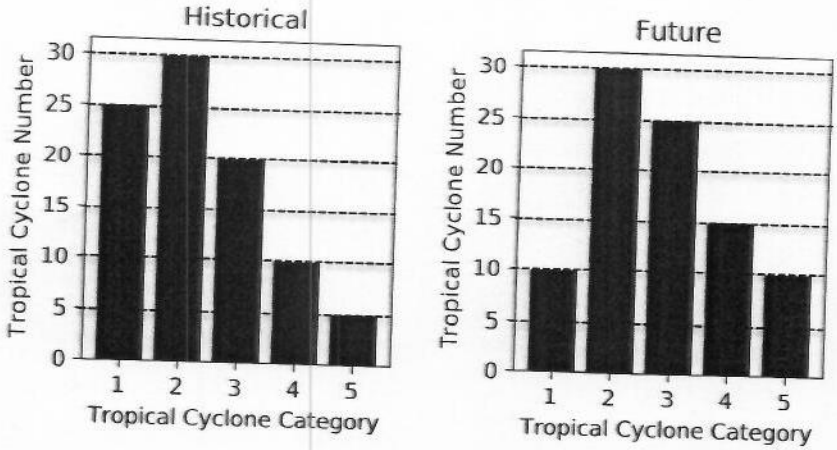
Answer: A B C D

24. If a planet takes 24 hours to complete one rotation about its axis what is the angular speed?

(A) 1.09×10^{-5} rad s^{-1}
(B) 1.45×10^{-5} rad s^{-1}
(C) 3.67×10^{-5} rad s^{-1}
(D) 7.27×10^{-5} rad s^{-1}

Answer: A B C D

25. The category-wise global tropical cyclone numbers for historical and future periods are given in the bar charts. Which one of the following statements is true?



(A) The sum of category-2 and 3 tropical cyclone numbers is same in both historical and future.
(B) The total numbers of category-2, 3, 4 and 5 tropical cyclones will increase in future.
(C) The total number of tropical cyclones summed over all categories is the same in historical and future.
(D) The sum of category-4 and 5 tropical cyclones will reduce in future.

Answer: A B C D

26. A train is leaving the station at a constant acceleration of 5 m s^{-2}. If the train has gained a speed of 90 km hr^{-1} by the time it is crossing a bridge, what is the time it took for the train to cover the distance between the station and the bridge?

(A) 5 minutes (B) 10 seconds (C) 1.5 hours (D) 5 seconds

Answer: A B C D

27. Choose the missing term in the series: AZ, GT, MN, _____ , YB

(A) KF (B) RX (C) SH (D) TS

Answer: A B C D

28. If Ignorance : Education; then Disease : _____ .

(A) Hospital (B) Doctor (C) Medicine (D) Nurse

Answer: A B C D

29. Pointing out to a girl a man said "my uncle is the uncle of this girl's uncle". How is the man related to the girl?

(A) Cousin (B) Brother (C) Father-in-law (D) Father

Answer: A B C D

30. Find the odd one out.

(A) Debit (B) Deposit (C) Deduction (D) Withdrawal

Answer: A B C D

31. If the radius of two spheres are in the ratio 1:2, then what will be the ratio of their volumes?

(A) 1:8 (B) 2:3 (C) 1:2 (D) 4:9

Answer: A B C D

32. A 50 litre mixture of paint is made of red, green, and blue colours in the ratio 5:3:2. If another 10 litre of blue colour is added, what will be the new ratio of the colours?

(A) 5:2:4 (B) 4:3:2 (C) 2:3:5 (D) 5:3:4

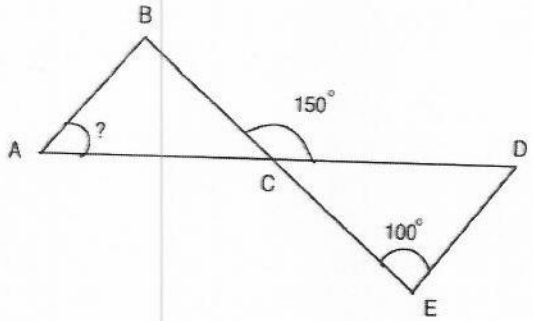
Answer: A B C D

33. Which one of the following is the odd one?

(A) 1,4,9 (B) 4,9,25 (C) 1,9,16 (D) 4,25,36

Answer: A B C D

34. In the given diagram, lines AB and DE are parallel. What is the angle BAC?



(A) 50° (B) 100° (C) 30° (D) 60°

Answer: A B C D

35. If APPLE is written as BRSPJ, what will be KITE?

(A) LKWI (B) LJUJ (C) MLVJ (D) LKKI

Answer: A B C D

36. If $\sin (6x + 24)° = \cos (5x + 11)°$, what is the value of x?

(A) 6 (B) 8 (C) 12 (D) 5

Answer: A B C D

Section C: Basic computing and data management knowledge

[Marks 1 × 30 = 30]

37. You are looking to purchase an enterprise storage server. You will prefer the disks to be of type _____

(A) SAS (B) SATA (C) SCSI (D) EIDE

Answer: A B C D

38. An array of disks is more likely to fail compared to a single disk. How is it that RAID arrays still manage to provide more data protection compared to a single disk?

(A) Using either mirroring or striping.
(B) Using either mirroring or parity.
(C) Using better quality disks.
(D) Using dedicated hardware.

Answer: A B C D

39. RS-232 is a standard that applies to _____ .

(A) networks (B) serial ports (C) game ports (D) parallel ports

Answer: A B C D

40. A hard disk is divided into tracks which are further subdivided into ____ .

(A) Clusters (B) Sectors (C) Vectors (D) Heads

Answer: A B C D

41. With respect to a network interface card, the term 10/100 refers to:

(A) minimum and maximum server speed (B) megabits per second
(C) protocol speed (D) a fiber speed

Answer: A B C D

42. _____ is the act of copying or downloading a program from a network and making multiple copies of it.

(A) Network piracy
(B) Software piracy
(C) Site-licensing piracy
(D) Plagiarism

Answer: A B C D

43. Applications communicate with kernel by using _____ .

(A) System calls (B) C programs (C) Shell script (D) Shell

Answer: A B C D

44. Which one of the following is not an object-oriented programming language?

(A) Python (B) PASCAL (C) Ruby (D) Java

Answer: A B C D

45. A 4GL (fourth generation language) is a _____ .

(A) structural language
(B) procedural language
(C) non-procedural language
(D) All of the above

Answer: A B C D

46. What is the use of compilers?

(A) Translates source code from a high-level programming language to lower level language.
(B) Convert word document to pdf document.
(C) Translates machine level to object level language.
(D) None of the above.

Answer: A B C D

47. A function inside another function is called a _____ function.

(A) Nested (B) Round (C) Sum (D) Grouped

Answer: A B C D

48. What does HTTP stand for?

(A) Hypertext Transfer Plotter
(B) Hypertext Transfer Plot
(C) Hypertext Transfer Protocol
(D) Head Tail Transfer Protocol

Answer: A B C D

49. If you are allowing a person on the network based on the credentials to maintain the security of your network, then this act refers to the process of _____.

(A) Authentication (B) Decryption (C) Encryption (D) Firewall

Answer: A B C D

50. Which type of cabling should you use to implement a network medium that is not susceptible to electromagnetic interference?

(A) Fiber-optic cables
(B) Category 5 UTP cable
(C) Thinnet coax
(D) Thicknet coax

Answer: A B C D

51. With an IP address of 100, you currently have 80 subnets. What subnet mask should you use to maximize the number of available hosts?

(A) 192 (B) 240 (C) 252 (D) 224

Answer: A B C D

52. 'LAN' means:

(A) Light Area Network
(B) Local Area network
(C) Large Area network
(D) Least Area Network

Answer: A B C D

53. Wi-Fi uses:

(A) optic fiber (B) phase lines (C) radio waves (D) sound waves

Answer: A B C D

54. P2P is a _____ application architecture.

(A) client/server (B) distributed (C) centralized (D) 1-tier

Answer: A B C D

55. The "ping" command is used for what purpose?

(A) Test a hard disk fault
(B) Test a device on a network whether it is reachable
(C) Test devices scanning quality
(D) Test a bug in the application

Answer: A B C D

56. To increase the response time and throughput, the kernel minimizes the frequency of disk access by keeping a pool of internal data buffer called:

(A) Pooling (B) Spooling (C) Buffer cache (D) Swapping

Answer: A B C D

57. To establish a secure encrypted connection between two hosts over an insecure network, you would use the command:

(A) telnet (B) sh (C) sync (D) ssh

Answer: A B C D

58. Unix is which kind of Operating System?

(A) Multi-user (B) Multi-processes (C) Multi-tasking (D) All of the above

Answer: A B C D

59. The command **find / -name '*'** will:

(A) List all the files and directories recursively starting from /
(B) List a file named * in /
(C) List all the files in /directory
(D) List all the files and directories in / directory

Answer: A B C D

60. Which is the core of the operating system?

(A) Shell (B) Script (C) Commands (D) Kernel

Answer: A B C D

61. To remove all the files and directories in the current working directory, you would use the command:

(A) del (B) rm (C) rm -rf (D) rf

Answer: A B C D

62. Which of the following in NOT a self-describing data format?

(A) XML (B) JSON (C) CSV (D) NetCDF

Answer: A B C D

63. Two different directories on different networked computers need to be identical. Which command would you use?

(A) sftp
(B) tar cf - * | (cd /target; tar xfp -)
(C) scp
(D) rsync

Answer: A B C D

64. Which among the following is the smallest unit in an image in a computer screen?

(A) Resolution (B) Array (C) Pixel (D) Clip

Answer: A B C D

65. The hexadecimal number system represents symbols _____ and _____.

(A) 0-9, A-E (B) 0-9, A-F (C) 1-10, A-E (D) 1-10, A-F

Answer: A B C D

66. In computers, binary system is used for

(A) Saving the documents
(B) Modify the data
(C) Processing the data
(D) Maintaining the data

Answer: A B C D