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SEAL

परीक्षा पुस्तिका श्रृंखला/Test Booklet Series : **A**

पुस्तिका सं./Booklet No. : 21233

परीक्षा प्रश्न-पुस्तिका/EXAMINATION QUESTION BOOKLET

निर्धारित समय : 3 घंटे (दृष्टिबाधित उम्मीदवारों के लिए : 4 घंटे)
Time Allowed : 3 Hours (For V.H. Candidates : 4 Hours)

अधिकतम अंक : 120
Maximum Marks : 120

रोल नं. :
Roll No. :

उत्तर शीट सं. :
Answer Sheet No. :

प्रश्नों के उत्तर देने से पहले निम्नलिखित अनुदेशों को ध्यान से पढ़ लें । इस पुस्तिका में प्रश्न अंग्रेजी में दिए गए हैं ।

Read the following instructions carefully before you begin to answer the questions. This booklet contains question in English.

उम्मीदवारों के लिए अनुदेश

1. प्रश्नों के उत्तर लिखना आरंभ करने से पहले आप इस पुस्तिका की जाँच करके देख लें कि इसमें पूरे पृष्ठ (1-24) हैं तथा कोई पृष्ठ या उसका भाग कम या दुबारा तो नहीं आ गया है । उम्मीदवारों का यह भी जाँच करनी है कि उनको केवल उस स्ट्रीम की परीक्षा-पुस्तिका मिली है जिसके लिए उन्होंने आवेदन किया है अर्थात कंप्यूटर साइंस/इंजीनियरिंग भाग या सूचना प्रौद्योगिकी भाग या इलेक्ट्रॉनिक्स और कम्युनिकेशन/टेलीकम्युनिकेशन भाग । यदि आप इस पुस्तिका में कोई त्रुटि पाएं, तो तत्काल इसके बदले दूसरी पुस्तिका ले लें ।

2. निरीक्षक द्वारा आपको ओ एम आर उत्तर-शीट अलग से दी जाएगी । ओ एम आर उत्तर-शीट में विवरण भरने से पहले, आपको ओ एम आर उत्तर-शीट पर मुद्रित अनुदेशों को सावधानी पूर्वक पढ़ना चाहिए । आपको ओ एम आर उत्तर-पुस्तिका में दिए गए अनुदेशों के अनुसार सावधानी पूर्वक उसमें विवरण और कोड लिखने चाहिए । प्रश्नों के उत्तर वास्तविक रूप में लिखना आरंभ करने से पहले आपको ओ एम आर उत्तर पुस्तिका में निर्धारित स्थान पर अपने हस्ताक्षर करने चाहिए । इन अनुदेशों का पूर्ण अनुपालन किया जाना चाहिए, ऐसा न किये जाने पर आपकी ओ एम आर उत्तर-शीट का मूल्यांकन नहीं किया जायेगा । (दृष्टिहीन उम्मीदवारों के लिए यह विवरण लेखक द्वारा भरे जायेंगे । फिर भी, सभी दृष्टिहीन उम्मीदवारों को ओ एम आर उत्तर-शीट में निर्धारित स्थान पर अपने बाएं हाथ के अंगूठे का निशान अवश्य लगाना चाहिए । इसके अतिरिक्त, जो दृष्टिहीन उम्मीदवार अपना हस्ताक्षर कर सकते हैं, वे अंगूठे के निशान के अलावा अपने हस्ताक्षर भी करें ।)

3. इस प्रश्न-पुस्तिका में 120 बहुविकल्पीय प्रश्न हैं (भाग A एवं भाग B प्रत्येक में 60 प्रश्न हैं) । प्रत्येक प्रश्न के 4 विकल्प दिए गए हैं A), B), C) और D) प्रत्येक प्रश्न का केवल एक विकल्प ही सही उत्तर है । यदि आपको एक से अधिक विकल्प सही लगें तो सबसे अधिक उचित विकल्प का चुनाव करें और उत्तर-पुस्तिका में प्रश्न के सामने वाले उपयुक्त गोले को काला करें ।

4. प्रत्येक सही उत्तर के लिए 1 अंक दिया जाएगा और प्रत्येक गलत उत्तर के लिए 0.25 अंक काट लिया जाएगा ।

5. उम्मीदवार को दोनों भागों के उत्तर लिखना अनिवार्य है ।

6. गोले को काला करने के लिए केवल काले/नीले बॉल प्वाइंट पेन का प्रयोग करें । गोले को एक बार काला करने के बाद इसको मिटाने या बदलने की अनुमति नहीं है । यदि किसी प्रश्न के सामने एक से ज्यादा गोले काले किये गए हों तो मशीन द्वारा उसके लिए शून्य अंक दिया जाएगा ।

7. किसी भी स्थिति में उत्तर-शीट को न मोड़ें ।

8. उत्तर-पुस्तिका पर कोई भी रफ कार्य नहीं करना है रफ कार्य के लिए इस पुस्तिका में स्थान दिया गया है ।

9. परीक्षा हॉल/कमरों में मोबाइल फोन तथा बेतार संचार साधन पूरी तरह निषिद्ध हैं । उम्मीदवारों को उनके अपने हित में सलाह दी जाती है कि मोबाइल फोन/किसी अन्य बेतार संचार साधन को स्विच ऑफ करके भी अपने पास न रखें । इस प्रावधान का अनुपालन न करने को परीक्षा में अनुचित उपायों का प्रयोग माना जायेगा और उनके विरुद्ध कार्रवाई की जाएगी, जिसमें उनकी उम्मीदवारी रद्द करना भी शामिल है ।

10. परीक्षार्थी को अपनी उत्तर-पुस्तिका शीट निरीक्षक को सौंपे बिना और उपस्थिति पत्रिका पर हस्ताक्षर किये बिना परीक्षा हॉल/कमरा नहीं छोड़ना चाहिए । ऐसा नहीं करने पर अयोग्य घोषित कर दिया जाएगा ।

Instructions to the Candidates

1. Before you start to answer the questions you must check up this booklet and ensure that it contains all the pages (1-24) and see that no page or portion thereof is missing or repeated. Candidates are also required to check that they have got the right question book strictly from the stream candidate has applied for i.e. Computer Science/ Engineering Part OR Information Technology Part OR Electronics and Communication/ Telecommunication Part. If you find any defect in this Booklet, you must get it replaced *immediately*.

2. You will be supplied the OMR Answer-Sheet separately by the Invigilator. Read the instructions printed on OMR Answer Sheet carefully before filling the information on the OMR Answer Sheet. You must complete and code the details as per the instructions given in the OMR Answer Sheet carefully. You must also put your signature on the OMR Answer-Sheet at the prescribed place before you actually start answering the questions. These instructions must be fully complied with, failing which, your Answer-Sheet will not be evaluated. (For V.H. candidates these details will be filled in by the scribe. However, all V.H. candidates must put their left-hand thumb impression at the space provided in the OMR Answer-Sheet. In addition, those V.H. candidates who can sign should also put their signatures in addition to thumb impression.)

3. This booklet consists of 120 Multiple choice questions (Section A and Section B both contains 60 questions each). Each question has 4 (four) alternatives A), B), C), and D). In any case only one alternative will be the correct answer. In case if you find more than one correct answer, then choose the most appropriate single option and darken the appropriate circle in the answer sheet in front of the related question.

4. For each correct answer One mark will be given and for each incorrect answer 0.25 marks will be deducted.

5. Candidate has to attempt both Sections compulsorily.

6. Use Black/Blue ball point Pen to darken the circle. Answer once darkened is not allowed to be erased or altered. Against any question if more than one circle is darkened, machine will allot **zero mark** for that question.

7. Do not fold Answer Sheet in any case.

8. No rough work is to be done on the Answer Sheet. Space for rough work has been provided in this booklet.

9. Mobile phones and wireless communication devices are completely banned in the examination hall / rooms. Candidates are advised not to keep mobile phones / any other wireless communication devices with them even switching it off, in their own interest. Failing to comply with this provision will be considered as using unfair means in the examination and action will be taken against them including cancellation of their candidature.

10. Candidate should not leave the examination hall/room without handing over his/her Answer sheet to the invigilator and without signing on the attendance sheet. Failing in doing so, will amount to disqualification.

जब तक आपसे कहा न जाए तब तक प्रश्न-पुस्तिका न खोलें /
DO NOT OPEN THE QUESTION BOOKLET UNTIL YOU ARE TOLD TO DO SO.

उम्मीदवार का नाम/Name of Candidate : _____

उम्मीदवार के हस्ताक्षर/Signature of Candidate : _____

SEAL

SEAL

SECTION – A
GENERAL APTITUDE

Choose the most appropriate option.

1. What is the maximum number of distinct handshakes that can happen in the room with 5 people in it ?

   A) 15
   B) 10
   C) 6
   D) 5

2. A train running at the speed of 60 km/hr crosses a pole in 9 seconds. What is the length of the train ?

   A) 120 metres
   B) 180 metres
   C) 324 metres
   D) 150 metres

3. The percentage profit earned by selling an article for Rs. 1,920 is equal to the percentage loss incurred by selling the same article for Rs. 1,280. At what price should the article be sold to make 25% profit ?

   A) Rs. 2,000
   B) Rs. 2,200
   C) Rs. 2,400
   D) Data inadequate

4. A boatman goes 2 km against the current of the stream in 1 hour and goes 1 km along the current in 10 minutes. How long will it take to go 5 km in stationary water ?

   A) 40 minutes
   B) 1 hour
   C) 1 hr 15 min
   D) 1 hr 30 min

5. The present ages of three persons in proportions 4 : 7 : 9. Eight years ago, the sum of their ages was 56. Find their present ages (in years).

   A) 8, 20, 28
   B) 16, 28, 36
   C) 20, 35, 45
   D) None of the above options

6. A tank is filled by three pipes with uniform flow. The first two pipes operating simultaneously fill the tank in the same time during which the tank is filled by the third pipe alone. The second pipe fills the tank 5 hours faster than the first pipe and 4 hours slower than the third pipe. The time required by the first pipe is

   A) 6 hours
   B) 10 hours
   C) 15 hours
   D) 30 hours

SPACE FOR ROUGH WORK

7. A rectangular field is to be fenced on three sides leaving a side of 20 feet uncovered. If the area of the field is 680 sq. feet, how many feet of fencing will be required ?

A) 34

B) 40

C) 68

D) 88

8. In how many different ways can the letters of the word 'CORPORATION' be arranged so that the vowels always come together ?

A) 810

B) 1440

C) 2880

D) 50400

9. Seats for Mathematics, Physics and Biology in a school are in the ratio of 5 : 7 : 8. There is a proposal to increase these seats by 40%, 50% and 75% respectively. What will be the ratio of increased seats ?

A) 2 : 3 : 4

B) 6 : 7 : 8

C) 6 : 8 : 9

D) None of the above options

10. A flagstaff 17.5 m high casts a shadow of length 40.25 m. The height of the building, which casts a shadow of length 28.75 m under similar condition will be

A) 10 m

B) 12.5 m

C) 17.5 m

D) 21.25 m

Find the odd one in the following series for Q. 11 and 12 :

11. 396, 462, 572, 427, 671, 264

A) 396

B) 427

C) 671

D) 264

12. 2, 5, 10, 17, 26, 37, 50, 64

A) 50

B) 26

C) 37

D) 64

13. The difference between simple and compound interests compounded annually on a certain sum of money for 2 years at 4% per annum is Re. 1. The sum (in Rs.) is

A) 625

B) 630

C) 640

D) 650

SPACE FOR ROUGH WORK

14. The angle of elevation of the sun, when the length of the shadow of a tree is 3 times the height of the tree, is
A) 30°
B) 45°
C) 60°
D) 90°

15. Let N be the greatest number that will divide 1305, 4665 and 6905, leaving the same remainder in each case. Then sum of the digits in N is
A) 4
B) 5
C) 6
D) 8

16. The study of fossils is known as
A) Ethnology
B) Palaeontology
C) Synecology
D) Ombrology

17. Who has been elected as the President of Cricket Association of Bengal (CAB) in 2015 ?
A) Sourav Ganguly
B) Anil Kumble
C) Sunil Gavaskar
D) Mohd. Azharuddin

18. Which company committed to invest $150 million for the Indian Startups during the Indian Prime Minister's Sept., 2015 US trip ?
A) Qualcomm
B) Yahoo
C) Google
D) Microsoft

19. What is the name of the Second Guided Missile Destroyer which has been commissioned into Indian Navy recently ?
A) INS Vajram
B) INS Kochi
C) INS Kolkata
D) INS Mumbai

20. Which cities hosted South Asian Games in January 2016 ?
A) Bhopal and Jaipur
B) Mumbai and Kolkata
C) New Delhi and Pune
D) Guwahati and Shillong

21. Which country is poised to become the third largest buyer of commercial passenger planes in the world with only the US and China ahead of it ?
A) France
B) India
C) Germany
D) None of the above options

SPACE FOR ROUGH WORK

22. Which city is being developed as the new capital of current state of Andhra Pradesh ?
    A) Hyderabad
    B) Amaravati
    C) Vishakhapatnam
    D) None of the above options

23. Garampani sanctuary is located at
    A) Junagarh, Gujarat
    B) Diphu, Assam
    C) Kohima, Nagaland
    D) Gangtok, Sikkim

24. Ashoka's 'Dhamma' or 'Law of Piety'
    A) had the essence of all religions
    B) was a revolt against inefficiency in the Buddhist Sangha
    C) was a new religion which he founded after the Kalinga War
    D) laid emphasis on following a strict set of rituals

25. Which two countries have voted against a Feb. 2017 UN resolution to impose sanctions against Syria over its alleged use of chemical weapons ?
    A) US and Russia
    B) US and France
    C) Russia and China
    D) France and China

26. Which country has recently unveiled a project dubbed "Mars 2117", under which it aims to establish the first inhabitable human settlement on planet Mars by year 2117 ?
    A) China
    B) Japan
    C) UAE
    D) South Korea

27. Daniel Ortega has been sworn in for a third consecutive term as President of which Central American Country ?
    A) Costa Rica
    B) Honduras
    C) Nicaragua
    D) El Salvador

28. Which among the following airports has claimed that it has become the first aerodrome in the world to adopt unique performance and benchmarking digital platform, Arc, which helps in tracking and monitoring building performance ?
    A) Indira Gandhi International (IGI) Airport, Delhi
    B) Babasaheb Ambedkar International Airport, Nagpur
    C) Sardar Vallabhbhai Patel International Airport, Ahmedabad
    D) Lokpriya Gopinath Bordoloi International Airport, Guwahati

SPACE FOR ROUGH WORK

29. "Socialist", "Secular", "Unity and Integrity of the Nation" [to replace only "Unity of the Nation"], were added in the Preamble as per which Amendment to the Indian Constitution ?

A) Thirty eighth Amendment 1975

B) Forty second Amendment 1976

C) Thirty first Amendment 1973

D) Forty fourth Amendment 1978

30. Which Nation won Davis Cup in 2016 ?

A) Switzerland

B) Spain

C) Argentina

D) England

31. 1. The hotel is two blocks east of the drugstore.

2. The market is one block west of the hotel.

3. The drugstore is west of the market.

If the first two statements are true, the third statement is

A) True

B) False

C) Uncertain

D) Insufficient data

32. Vincent has a paper route. Each morning, he delivers 37 newspapers to customers in his neighborhood. It takes Vincent 50 minutes to deliver all the papers. If Vincent is sick or has other plans, his friend Thomas, who lives on the same street, will sometimes deliver the papers for him.

From the above data, which of the following statements must be true ?

A) Vincent and Thomas live in the same neighborhood

B) It takes Thomas more than 50 minutes to deliver the papers

C) It is dark outside when Vincent begins his deliveries

D) Thomas would like to have his own paper route

33. Which number pair comes next in the series ?

4 7 26 10 13 20 16

A) 14 4

B) 14 17

C) 18 14

D) 19 14

34. Which word does not belong with the others ?

A) Cornea

B) Retina

C) Vision

D) Pupil

SPACE FOR ROUGH WORK

35. Complete the missing element of the following series :

E m E | m m m | E ш E | ш ? ш

m	E	ш	Ξ
(1)	(2)	(3)	(4)

A) 1

B) 2

C) 3

D) 4

36. JAK, KBL, LCM, MDN, _____

A) OEP

B) NEO

C) MEN

D) PFQ

37. FAG, GAF, HAI, IAH, _____

A) JAK

B) HAL

C) HAK

D) JAI

38. Applying for Seasonal Employment occurs when a person requests to be considered for a job that is dependent on a particular season or time of year. Which situation below is the best example of Applying for Seasonal Employment ?

A) The Ski instructors at Top of the Peak Ski School work from December through March

B) Matthew prefers jobs that allow him to work outdoors

C) Lucinda makes an appointment with the beach resort restaurant manager to interview for the summer waitressing position that was advertised in the newspaper

D) Doug's ice cream shop stays open until 11 p.m. during the summer months

39. QAR, RAS, SAT, TAU, _____

A) UAV

B) UAT

C) TAS

D) TAT

SPACE FOR ROUGH WORK

40. If

gorblflur means fan belt

pixngorbl means ceiling fan

arthtusl means tile roof

Which word could mean "ceiling tile" ?

A) gorbltusl

B) flurgorbl

C) arthflur

D) pixnarth

41. The town of Paranda is located on Green Lake. The town of Akram is West of Paranda. Tokhada is East of Akram but West of Paranda. Kokran is East of Bopri but West of Tokhada and Akram. If they are all in the same district, which town is the farthest West ?

A) Paranda

B) Kokran

C) Akram

D) Bopri

42. Get odd one out.

A) YWU

B) NLJ

C) KIF

D) VTR

43. Two students appeared at an examination. One of them secured 9 marks more than the other and his marks were 56% of the sum of their marks. The marks obtained by them are

A) 39, 30

B) 41, 32

C) 42, 33

D) 43, 34

44. Find the number of triangles in the given figure.

A) 8

B) 10

C) 12

D) 14

45. Choose a figure which would most closely resemble the unfolded form of Figure (Z).

A) 1

B) 2

C) 3

D) 4

SPACE FOR ROUGH WORK

A

SC – B

IT
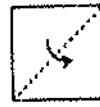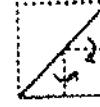
Each of questions **46** to **50** are based on the information given below :

8 persons E, F, G, H, I, J, K and L are seated around a square table - two on each side.

There are 3 ladies who are not seated next to each other.

J is between L and F.

G is between I and F.

H, a lady member is second to the left of J.

F, a male member is seated opposite to E, a lady member.

There is a lady member between F and I.

46. Who among the following is to the immediate left of F ?

A) G

B) I

C) J

D) H

47. What is true about J and K ?

A) J is male, K is female

B) J is female, K is male

C) Both are female

D) Both are male

48. How many persons are seated between K and F ?

A) 1

B) 2

C) 3

D) 4

49. Who among the following are three lady members ?

A) E, H and J

B) E, F and G

C) E, H and G

D) C, H and J

50. Who among the following is seated between E and H ?

A) F

B) I

C) K

D) Cannot be determined

51. Choose the most appropriate words from the options given below to complete the following sentence :

Female sparrows and immatures are _____, while the typical adult male sparrow is _____ by its markings: a black bib, a grey cap, and white lines trailing down from the mouth.

A) somewhat nondescript, easily recognized

B) difficult to spot, better camouflaged

C) considered to be endangered, characterized

D) comparatively small, made more conspicuous

SPACE FOR ROUGH WORK

A   -9-   **SC – B**

52. Find the best correction for the underlined sentence from the four options given below:
Under a provision of the Constitution that <u>was never applied, Congress has been required to call a convention for considering possible amendments to the document when formally asked to do it</u> by the legislatures of two-thirds of the states.

A) was never applied, Congress has been required to call a convention for considering possible amendments to the document when formally asked to do it

B) was never applied, there has been a requirement that Congress call a convention for consideration of possible amendments to the document when asked to do it formally

C) has never been applied, whereby Congress is required to call a convention to consider possible amendments to the document when formally asked to do so

D) has never been applied, Congress is required to call a convention to consider possible amendments to the document when formally asked to do so

53. **Statement :** Should all the drugs patented and manufactured in Western countries be first tried out on sample basis before giving license for sale to general public in India?

Arguments :

I. Yes. Many such drugs require different doses and duration for Indian population and hence it is necessary.

II. No. This is just not feasible and hence cannot be implemented.

Choose from the following :

A) Only argument I is strong
B) Only argument II is strong
C) Either I or II is strong
D) Neither I nor II is strong

54. A Huge majority - 84 percent - of the population identifies as Hindu. There are many variations of Hinduism, and four predominant sects - Shaiva, Vaishnava, Shakteya and Smarta. About 13 percent of Indians are Muslim, making it one of the largest Islamic nations in the world. Christians and Sikhs make up a small percentage of the population, and there are even fewer Buddhists and Jains.

The passage best supports the statement that

A) Culture, Traditions and Customs of India are diverse

B) India is known as a multilingual country

C) India is identified as the birthplace of Hinduism and Buddhism

D) India is a country where diversity in religion exists

55. Choose the appropriate answer to complete the following sentence :

To those of us who had always thought him timid, his _____ came as a surprise.

A) inability

B) inevitability

C) intrepidity

D) inertness

SPACE FOR ROUGH WORK

56. Three ladies X, Y and Z marry three men A, B and C. X is married to A, Y is not married to an engineer, Z is not married to a doctor, C is not a doctor and A is a lawyer. Only monogamous relationships are permitted. Then which of the following statements is correct ?

A) Y is married to C who is an engineer

B) Z is married to C who is a doctor

C) X is married to a doctor

D) None of the above options

57. Arrange sentences **A, B, C** and **D** between sentences **1** and **6**, to form a logical sequence of six sentences.

1. The new economic policy comprises the various measures and changes introduced since July 1991.

A) There is a common thread running through all these measures

B) The objective is simple – to improve the efficiency of the system.

C) The regulatory mechanism involving multitude of controls has fragmented the capacity and reduced competition even in the private sector.

D) The thrust of the new policy is towards creating a more competitive environment as a means to improving the productivity and efficiency of the economy.

6. This is to be activated by removing the barriers and restrictions on the entry and growth of firms.

A) DCAB   B) ABCD

C) BDAC   D) DCBA

58. Correct the underlined part of the sentence by choosing the correct option.

Bombast <u>is when high sounding words for effect, not suitability, are used</u>.

A) is when high sounding words for effect, not suitability, are used

B) is the use of high-sounding words for effect rather than for suitability

C) is where high-sounding words are used for effect not suitability

D) is the using of high-sounding words for effect only

59. Pick the word from the four options which is most nearly opposite in meaning to the bold word.

RECALCITRANT

A) feckless   B) yielding

C) sombre   D) polished

60. 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.

QUISLING : BETRAY

A) taunt   :   provoke

B) inception   :   termination

C) juggernaut :   crush

D) obstinate   :   preserve

SPACE FOR ROUGH WORK

SECTION – B
INFORMATION TECHNOLOGY

Choose the most appropriate option.

61. Given an undirected graph G with V vertices and E edges, the sum of the degrees of all vertices is
    A) E
    B) 2E
    C) V
    D) 2V

62. Which of the following is an advantage of adjacency list representation over adjacency matrix representation of a graph ?
    A) In adjacency list representation, space is saved for sparse graphs.
    B) Deleting a vertex in adjacency list representation is easier than adjacency matrix representation.
    C) Adding a vertex in adjacency list representation is easier than adjacency matrix representation.
    D) All of the option

63. A path in graph G, which contains every vertex of G once and only once?
    A) Eular Circuit
    B) Hamiltonian Path
    C) Eular Path
    D) Hamiltonian Circuit

64. What are the appropriate data structures for graph traversal using Breadth First Search (BFS) and Depth First Search (DFS) algorithms ?
    A) Stack for BFS and Queue for DFS
    B) Queue for BFS and Stack for DFS
    C) Stack for BFS and Stack for DFS
    D) Queue for BFS and Queue for DFS

65. In a given following graph among the following sequences :
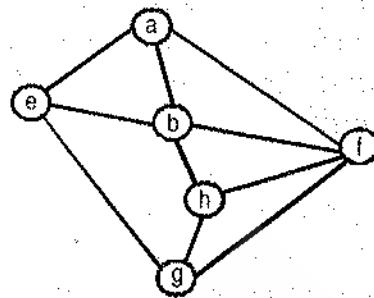
    I)   a b e g h f
    II) a b f e h g
    III) a b f h g e
    IV) a f g h b e

    Which are depth first traversals of the above graph?
    A) I, II and IV only
    B) I and IV only
    C) II, III and IV only
    D) I, III and IV only

66. Considering the following graph, which one of the following set of edges represents all the bridges of the given graph?
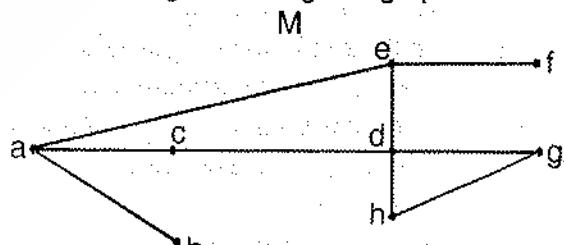
    A) (a,b), (e,f)
    B) (a,b), (a,c)
    C) (c,d), (d,h)
    D) (a,b)

SPACE FOR ROUGH WORK

67. Which of the following statements is/are TRUE ?

S1 : The existence of an Euler circuit implies that an Euler path exists.

S2 : The existence of an Euler path implies that an Euler circuit exists.

A) S1 is true
B) S2 is true
C) S1 and S2 both are true
D) S1 and S2 both are False

68. A connected planar graph divides the plane into a number of regions. If the graph has eight vertices and these are linked by 13 edges, then the number of regions is:

A) 5
B) 6
C) 7
D) 8

69. Power set of empty set has exactly _____ subset.

A) One
B) Two
C) Zero
D) Three

70. What is the Cartesian product of A = {1, 2} and B = {a, b} ?

A) {(1, a), (1, b), (2, a), (b, b)}
B) {(1, 1), (2, 2), (a, a), (b, b)}
C) {(1, a), (2, a), (1, b), (2, b)}
D) {(1, 1), (a, a), (2, a), (1, b)}

71. What is the Cardinality of the Power set of the set {0, 1, 2} ?

A) 8
B) 6
C) 7
D) 9

72. Let G be a simple connected planar graph with 13 vertices and 19 edges. Then, the number of faces in the planar embedding of the graph is

A) 6
B) 8
C) 9
D) 13

73. Which of the following statements is false ?

A) $(P \wedge Q) \vee (\sim P \wedge Q) \vee (P \wedge \sim Q)$ is equal to $\sim Q \wedge \sim P$
B) $(P \wedge Q) \vee (\sim P \wedge Q) \vee (P \wedge \sim Q)$ is equal to $Q \vee P$
C) $(P \wedge Q) \vee (\sim P \wedge Q) \vee (P \wedge \sim Q)$ is equal to $Q \vee (P \wedge \sim Q)$
D) $(P \wedge Q) \vee (\sim P \wedge Q) \vee (P \wedge \sim Q)$ is equal to $P \vee (Q \wedge \sim P)$

74. There are four bus lines between A and B; and three bus lines between B and C.

The number of way a person roundtrip by bus from A to C by way of B will be

A) 12
B) 7
C) 144
D) 264

75. The number of diagonals that can be drawn by joining the vertices of an octagon is

A) 28
B) 48
C) 20
D) None of the option

76. A partial ordered relation is transitive, reflexive and

A) antisymmetric
B) bisymmetric
C) antireflexive
D) asymmetric

SPACE FOR ROUGH WORK

A

-13-

SC – B

77. Let N = {1, 2, 3,....}
    be ordered by divisibility, which of the following subset is totally ordered ?
    A) (2, 6, 24)   B) (3, 5, 15)
    C) (2, 9, 16)   D) (4, 15, 30)

78. If B is a Boolean algebra, then which of the following is true ?
    A) B is a finite but not complemented lattice.
    B) B is a finite, complemented and distributive lattice.
    C) B is a finite, distributive but not complemented lattice.
    D) B is not distributive lattice

79. If R is a relation in Relational Data Model and A_1, A_2, ...A_n are the attributes of relation R, what is the cardinality of R expressed in terms of domain of attributes ?
    A) $|R| \le |dom(A_1) \times dom(A_2) ... dom(A_n)|$
    B) $|R| \ge |dom(A_1) \times dom(A_2) ... dom(A_n)|$
    C) $|R| = max(|dom(A_1)|, |dom(A_2)|, ... |dom(A_n)|)$
    D) $|R| = min(|dom(A_1)|, |dom(A_2)|, ... |dom(A_n)|)$

80. If A and B are two sets and $A \cup B = A \cap B$ then
    A) $A = \phi$ B) $B = \phi$
    C) $A \ne B$ D) $A = B$

81. The relation { (1,2), (1,3), (3,1), (1,1), (3,3), (3,2), (1,4), (4,2), (3,4)} is
    A) Reflexive   B) Transitive
    C) Symmetric   D) Asymmetric

82. Let L be a lattice. Then for every a and b in L which one of the following is correct?
    A) $a \vee b = a \wedge b$
    B) $a \vee (B \vee C) = (a \vee B) \vee C$
    C) $a \vee (b \wedge c) = a$
    D) $a \vee (b \vee c) = b$

83. The probability that top and bottom cards of a randomly shuffled deck are both aces is :
    A) $4/52 \times 4/52$
    B) $4/52 \times 3/52$
    C) $4/52 \times 3/51$
    D) $4/52 \times 4/51$

84. The coupling between different modules of a software is categorized as follows:
    I. Content coupling
    II. Common coupling
    III. Control coupling
    IV. Stamp coupling
    V. Data coupling

    Coupling between modules can be ranked in the order of strongest (least desirable) to weakest (most desirable) as follows:
    A) I-II-III-IV-V
    B) V-IV-III-II-I
    C) I-III-V-II-IV
    D) IV-II-V-III-I

SPACE FOR ROUGH WORK

85. Which of the following statements are TRUE ?

I. The context diagram should depict the system as a single bubble.

II. External entities should be identified clearly at all levels of DFDs.

III. Control information should not be represented in a DFD.

IV. A data store can be connected either to another data store or to an external entity.

A) II and IV   B) II and III

C) I and III   D) I, II and III

86. The following program is to be tested for statement coverage :

```
begin
  if (a== b) {S1; exit;}
  else if (c== d) {S2;}
     else {S3; exit;}
  S4;
end
```

The test cases T1, T2, T3 and T4 given below are expressed in terms of the properties satisfied by the values of variables a, b, c and d. The exact values are not given.

T1 : a, b, c and d are all equal

T2 : a, b, c and d are all distinct

T3 : a = b and c != d

T4 : a != b and c = d

Which of the test suites given below ensures coverage of statements S1, S2, S3 and S4 ?

A) T1, T2, T3   B) T2, T4

C) T3, T4   D) T1, T2, T4

87. The Function Point (FP) calculated for software projects are often used to obtain an estimate of Lines of Code (LOC) required for that project. Which of the following statements is FALSE in this context ?

A) The relationship between FP and LOC depends on the programming language used to implement the software.

B) LOC requirement for an assembly language implementation will be more for a given FP value, than LOC for implementation in COBOL.

C) On an average, one LOC of C++ provides approximately 1.6 times the functionality of a single LOC of FORTRAN

D) FP and LOC are not related to each other

88. The availability of complex software is 90%. Its Mean Time Between Failure (MTBF) is 200 days. Because of the critical nature of the usage, the organization deploying the software further enhanced it to obtain an availability of 95%. In the process, the Mean Time To Repair (MTTR) increased by 5 days.

What is the MTBF of the enhanced software ? (Choose the nearest option)

A) 205 days

B) 300 days

C) 500 days

D) 700 days

SPACE FOR ROUGH WORK

89. HTML (Hypertext Markup Language) has language elements which permit certain actions other than describing the structure of the web document. Which one of the following actions is NOT supported by pure HTML (without any server or client side scripting) pages ?

A) Embed web objects from different sites into the same page

B) Refresh the page automatically after a specified interval

C) Automatically redirect to another page upon download

D) Display the client time as part of the page

90. Consider the HTML table definition given below :

```
< table border=1>
<tr>
<td rowspan=2> ab </td>
<td colspan=2> cd </td>
</tr>
<tr>
<td> ef </td>
<td rowspan=2> gh </td>
</tr>
<tr> <td colspan=2> ik </td>
</tr>
</table>
```

The number of rows in each column and the number of columns in each row are:

A) (2, 2, 3) and (2, 3, 2)

B) (2, 2, 3) and (2, 2, 3)

C) (2, 3, 2) and (2, 3, 2)

D) (2, 3, 2) and (2, 2, 3)

91. Which of following statements is/are False ?

1. XML overcomes the limitations in HTML to support a structured way of organizing content.

2. XML specification is not case sensitive while HTML specification is case sensitive.

3. XML supports user defined tags while HTML uses pre-defined tags.

4. XML tags need not be closed while HTML tags must be closed.

A) 2 only B) 1 only

C) 2 and 4 only D) 3 and 4 only

92. Output of following program

```
#include <stdio.h>
int main()
{
    int i = 5;
    printf("%d %d %d", i++, i++, i++);
    return 0;
}
```

A) 7 6 5

B) 5 6 7

C) 7 7 7

D) Compiler Dependent

93. Output of following program ?

```
#include<stdio.h>
void dynamic(int s, ...)
{
    printf("%d ", s);
}
int main()
{
    dynamic(2, 4, 6, 8);
    dynamic(3, 6, 9);
    return 0;
}
```

A) 2 3 B) Compiler Error

C) 4 3 D) 3 2

SPACE FOR ROUGH WORK

94. Output of following program ?

```c
#include <stdio.h>
int main()
{
    int *ptr;
    int x;
    ptr = &x;
    *ptr = 0;
    printf(" x = %d\n", x);
    printf(" *ptr = %d\n", *ptr);
    *ptr += 5;
    printf(" x = %d\n", x);
    printf(" *ptr = %d\n", *ptr);
    (*ptr)++;
    printf(" x = %d\n", x);
    printf(" *ptr = %d\n", *ptr);
    return 0;
}
```

A) x = 0
    *ptr = 0
    x = 5
    *ptr = 5
    x = 6
    *ptr = 6

B) x = garbage value
    *ptr = 0
    x = garbage value
    *ptr = 5
    x = garbage value
    *ptr = 6

C) x = 0
    *ptr = 0
    x = 5
    *ptr = 5
    x = garbage value
    *ptr = garbage value

D) x = 0
    *ptr = 0
    x = 0
    *ptr = 0
    x = 0
    *ptr = 0

95. Assume that float takes 4 bytes, predict the output of following program.

```c
#include <stdio.h>
int main()
{
    float arr[5] = {12.5, 10.0, 13.5, 90.5, 0.5};
    float *ptr1 = &arr[0];
    float *ptr2 = ptr1 + 3;
    printf("%f ", *ptr2);
    printf("%d", ptr2 - ptr1);
    return 0;
}
```

A) 90.500000   3   B) 90.500000   12

C) 10.000000   12   D) 0.500000   3

96. Assume that size of an integer is 32 bit. What is the output of following ANSI C program ?

```c
#include<stdio.h>
struct st
{
    int x;
    static int y;
};
int main()
{
    printf("%d", sizeof(struct st));
    return 0;
}
```

A) 4

B) 8

C) Compiler Error

D) Runtime Error

SPACE FOR ROUGH WORK

97. Consider the following C declaration

```
struct {
    short s[5];
    union {
        float y;
        long z;
    }u;
} t;
```

Assume that objects of the type short, float and long occupy 2 bytes, 4 bytes and 8 bytes, respectively. The memory requirement for variable t, ignoring alignment considerations, is

A) 22 bytes

B) 14 bytes

C) 18 bytes

D) 10 bytes

98.
```
#include<stdio.h>
struct st
{
    int x;
    struct st next;
};
int main()
{
    struct st temp;
    temp.x = 10;
    temp.next = temp;
    printf("%d", temp.next.x);
    return 0;
}
```

A) Compiler Error

B) 10

C) Runtime Error

D) Garbage Value

99. Give the Output

```
#include<iostream>
using namespace std;
class Base
{
public :
    int x, y;
public:
    Base(int i, int j){ x = i; y = j; }
};
class Derived : public Base
{
public:
    Derived(int i, int j):x(i), y(j) {}
    void print() {cout << x <<" "<< y; }
};
int main(void)
{
    Derived q(10, 10);
    q.print();
    return 0;
}
```

A) 10 10

B) Compiler Error

C) 0 0

D) None of the option

SPACE FOR ROUGH WORK

100. Give the Output

```cpp
#include <iostream>
using namespace std;
class Base1 {
public:
    ~Base1()  { cout << " Base1's
    destructor" << endl; }
};
class Base2 {
public:
    ~Base2()  { cout << " Base2's
    destructor" << endl; }
};
class Derived: public Base1, public Base2 {
public:
    ~Derived()  { cout << " Derived's
    destructor" << endl; }
};
int main()
{
    Derived d;
    return 0;
}
```

A) Base1's destructor
   Base2's destructor
   Derived's destructor

B) Derived's destructor
   Base2's destructor
   Base1's destructor

C) Derived's destructor

D) Compiler Dependent

101. Which of the following is/are true about packages in Java ?

1) Every class is part of some package.

2) All classes in a file are part of the same package.

3) If no package is specified, the classes in the file go into a special unnamed package.

4) If no package is specified, a new package is created with folder name of class and the class is put in this package.

A) Only 1, 2 and 3

B) Only 1, 2 and 4

C) Only 4

D) Only 1 and 3

102. Which of the following is FALSE about abstract classes in Java ?

A) If we derive an abstract class and do not implement all the abstract methods, then the derived class should also be marked as abstract using 'abstract' keyword.

B) Abstract classes can have constructors.

C) A class can be made abstract without any abstract method.

D) A class can inherit from multiple abstract classes.

SPACE FOR ROUGH WORK

103. Which of the following is true about interfaces in java ?

1) An interface can contain following type of members.

....public, static, final fields (i.e., constants)

....default and static methods with bodies

2) An instance of interface can be created.

3) A class can implement multiple interfaces.

4) Many classes can implement the same interface.

A) 1, 3 and 4

B) 1, 2 and 4

C) 2, 3 and 4

D) 1, 2, 3 and 4

104. Consider three processes (process id 0, 1, 2 respectively) with compute time bursts 2, 4 and 8 time units. All processes arrive at time zero. Consider the Longest Remaining Time First (LRTF) scheduling algorithm. In LRTF ties are broken by giving priority to the process with the lowest process id. The average turn around time is:

A) 13 units

B) 14 units

C) 15 units

D) 16 units

105. Consider three processes, all arriving at time zero, with total execution time of 10, 20 and 30 units, respectively. Each process spends the first 20% of execution time doing I/O, the next 70% of time doing computation, and the last 10% of time doing I/O again. The operating system uses a shortest remaining compute time first scheduling algorithm and schedules a new process either when the running process gets blocked on I/O or when the running process finishes its compute burst. Assume that all I/O operations can be overlapped as much as possible. For what percentage of time does the CPU remain idle?

A) 0%

B) 10.6%

C) 30.0%

D) 89.4%

106. Consider three CPU-intensive processes, which require 10, 20 and 30 time units and arrive at times 0, 2 and 6, respectively. How many context switches are needed if the operating system implements a shortest remaining time first scheduling algorithm? Do not count the context switches at time zero and at the end.

A) 1

B) 2

C) 3

D) 4

SPACE FOR ROUGH WORK

107. Which of the following process scheduling algorithm may lead to starvation ?
    A) FIFO
    B) Round Robin
    C) Shortest Job Next
    D) None of the option

108. A scheduling algorithm assigns priority proportional to the waiting time of a process. Every process starts with priority zero (the lowest priority). The scheduler re-evaluates the process priorities every T time units and decides the next process to schedule. Which one of the following is TRUE if the processes have no I/O operations and all arrive at time zero ?
    A) This algorithm is equivalent to the first-come-first-serve algorithm.
    B) This algorithm is equivalent to the round-robin algorithm.
    C) This algorithm is equivalent to the shortest-job-first algorithm.
    D) This algorithm is equivalent to the shortest-remaining-time-first algorithm.

109. Which one of the following is true ?
    A) NAND gate and AND gate both are universal gates
    B) NOR gate and OR gate both are universal gates
    C) NAND gate and OR gate both are universal gates
    D) NAND gate and NOR gate both are universal gates

110. Which one of the following is the function of a multiplexer ?
    A) To decode information
    B) To select 1 out of N input data sources and to transmit it to single channel
    C) To transmit data on N lines
    D) To perform serial to parallel conversion

111. In digital logic, if $A \oplus B = C$, then which one of the following is true?
    A) $A \oplus C = B$
    B) $B \oplus C = A$
    C) $A \oplus B \oplus C = 0$
    D) Both A) and B)

112. 'AS' clause is used in SQL for
    A) Selection operation
    B) Rename operation
    C) Join operation
    D) Projection operation

113. Related fields in a database are grouped to form a
    A) data file
    B) data record
    C) menu
    D) bank

114. Cross Product is a
    A) Unary Operator
    B) Ternary Operator
    C) Binary Operator
    D) Not an Operator

SPACE FOR ROUGH WORK

115. A table joined with itself is called
   A) Join
   B) Self Join
   C) Outer Join
   D) Equi Join

116. Consider the join of a relation R with relation S. If R has m tuples and S has n tuples, then the maximum size of join is
   A) mn
   B) m+n
   C) (m+n)/2
   D) 2(m+n)

117. If an SQL query involves NOT, AND, OR with no parenthesis
   A) NOT will be evaluated first; AND will be evaluated second; OR will be evaluated last.
   B) NOT will be evaluated first; OR will be evaluated second; AND will be evaluated last.
   C) AND will be evaluated first; OR will be evaluated second; NOT will be evaluated last.
   D) The order of occurrence determines the order of evaluation.

118. In tuple relational calculus P1 → P2 is equivalent to
   A) ¬ P1 ∨ P2
   B) P1 ∨ P2
   C) P1 ∧ P2
   D) P1 ∧ ¬ P2

119. What is the running time of the following function (specified as a function of the input value) ?

```
void Function(int n) {
int i=1 ;
int s=1 ;
while( s <= n) {
i++ ;
s= s+i ;
}
}
```

   A) O(n)
   B) O(n²)
   C) O(1)
   D) O(√n)

120. 0/1 - Knapsack is a well known problem where, it is desired to get the maximum total profit by placing n items (each item is having some weight and associated profit) into a knapsack of capacity W. The table given below shows the weights and associated profits for 5 items, where one unit of each item is available to you. It is also given that the knapsack capacity W is 8. If the given 0/1 knapsack problem is solved using Dynamic Programming, which one of the following will be maximum earned profit by placing the items into the knapsack of capacity 8.

Item #	Weight	Associated Profit
1	1	3
2	2	5
3	4	9
4	5	11
5	8	18

   A) 19
   B) 18
   C) 17
   D) 20

SPACE FOR ROUGH WORK

A

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SC – B

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