



# Teachingninja.in



**Latest Govt Job updates**



**Private Job updates**



**Free Mock tests available**

**Visit - [teachingninja.in](http://teachingninja.in)**



Teachingninja.in

**NIELIT**

**Previous Year Paper**  
**Scientist B 22 July 2017**  
**(Electronics &**  
**Telecommunication)**



## परीक्षा प्रश्न-पुस्तिका / EXAMINATION QUESTION BOOKLET

निर्धारित समय : 3 घंटे (दुष्टिबाधित उम्मीदवारों के लिए : 4 घंटे)

अधिकतम अंक : 120

Time Allowed : 3 Hours (For V.H. Candidates : 4 Hours)

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

- प्रश्नों के उत्तर लिखा आरंभ करने से पहले आप इस पुस्तिका की जाँच करके देख लें कि इसमें पूरे पाठ (1-24) हैं या कोई पूर्ण या उसका भाग कम या दुग्धारा तो नहीं आ गया है। उम्मीदवारों को यह भी जाँच करनी है कि उनको केवल उस स्ट्रीम की परीक्षा-पुस्तिका मिली है जिसके लिए उन्होंने अपने अवेदन किया है अर्थात् कंप्यूटर साइंस/इंजीनियरिंग भाग या सूचना प्रौद्योगिकी भाग या इलेक्ट्रॉनिक्स और कम्युनिकेशन/टेलीकॉम्युनिकेशन भाग या वहि आप इस पुस्तिका में कोई नुस्खा पाएं, तो तत्काल इसके बदले दूरी पुस्तिका ले लें।
- नियंत्रक द्वारा आपको ओएमआर उत्तर-शीट अलम से दी जाएगी। ओएमआर उत्तर-शीट में विवरण भरने से पहले, आपको ओएमआर उत्तर-शीट पर मुद्रित अनुदेशों को सावधानी पूर्वक पढ़ा चाहिए। आपको ओएमआर 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 ओएमआर उत्तर-पुस्तिका में निर्धारित स्थान पर अपने हस्ताक्षर करने चाहिए। इन अनुदेशों का पूरा अनुपालन किया जाना चाहिए, ऐसा न किये जाने पर आपको ओएमआर उत्तर-शीट का मूल्यांकन नहीं किया जाएगा। (दुष्टिबाधित उम्मीदवारों के लिए यह विवरण लेखक द्वारा भरे जायेंगे। नियंत्रक द्वारा उम्मीदवारों को ओएमआर उत्तर-शीट में निर्धारित स्थान पर अपने बाएं हाथ के अंगूठे का निशान अवश्य लगाना चाहिए। इसके अतिरिक्त, जो दुष्टिबाधित उम्मीदवार अपना हस्ताक्षर कर सकते हैं, वे अंगूठे के निशान के अलावा अपने हस्ताक्षर भी करें।)
- इस प्रश्न-पुस्तिका में 120 बहुविकल्पीय प्रश्न हैं (भाग A एवं भाग B प्रत्येकमें 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 लाईं तो सबसे अधिक उत्तिष्ठित विकल्प को चुनाव करें और उत्तर-पुस्तिका में प्रश्न के सामने यासे उपयुक्त गोले को काला करें।
- प्रत्येक सही उत्तर के लिए 1 अंक दिया जाएगा और प्रत्येक गलत उत्तर के लिए 0.25 अंक काट लिया जाएगा।
- उम्मीदवार को दोनों भागों के उत्तर लिखना अनिवार्य है।
- गोले को यांत्रिक रूप से चुनाव 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।
- किसी भी स्थिति में उत्तर-शीट को न मोड़ें।
- उत्तर-पुस्तिका पर कोई भी रक्कार्य नहीं करना है एक कार्यके के लिए इस पुस्तिका में स्थान दिया गया है।
- परीक्षा हाल/कामरों में मोबाइल फोन या बेटार सचार साधन पूरी तरह निषिद्ध हैं। उम्मीदवारों को उनके अपने हित में सलाह दी जाती है कि मोबाइल फोन/किसी अन्य बेटार सचार साधन को स्थित अकार करके भी अपने पास न रखें। इस प्रावधान का अनुपालन न करने को परीक्षा कार्यवाही की जाएगी, जिसमें उनकी उम्मीदवारी रख करना भी शामिल है।
- परीक्षार्थी को अपनी उत्तर-पुस्तिका शीट नियंत्रक को सौंपे लिया और उपस्थिति पत्रिका पर हस्ताक्षर किये जिसमें उनकी उम्मीदवारी रख करना भी शामिल है। ऐसा नहीं करने पर अयोग्य घोषित कर दिया जाएगा।

## Instructions to the Candidates

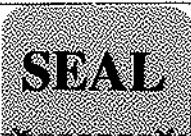
- Before you start to answer the questions you must check up this booklet and ensure that it contains all the pages (1-24) and see that no page or portion thereof is missing or repeated. Candidates are also required to check that they have got the right question book strictly from the stream candidate 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*.
- 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.)
- 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.
- For each correct answer One mark will be given and for each incorrect answer 0.25 marks will be deducted.
- Candidate has to attempt both Sections compulsorily.
- 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.
- Do not fold Answer Sheet in any case.
- No rough work is to be done on the Answer Sheet. Space for rough work has been provided in this booklet.
- 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.
- 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 :



## GENERAL APTITUDE

Choose the most appropriate option.

- What is the maximum number of distinct handshakes that can happen in the room with 5 people in it ?
  - 15
  - 10
  - 6
  - 5
- A train running at the speed of 60 km/hr crosses a pole in 9 seconds. What is the length of the train ?
  - 120 metres
  - 180 metres
  - 324 metres
  - 150 metres
- 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 ?
  - Rs. 2,000
  - Rs. 2,200
  - Rs. 2,400
  - Data inadequate

- 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 ?
  - 40 minutes
  - 1 hour
  - 1 hr 15 min
  - 1 hr 30 min
- 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).
  - 8, 20, 28
  - 16, 28, 36
  - 20, 35, 45
  - None of the above options
- 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
  - 6 hours
  - 10 hours
  - 15 hours
  - 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

- 30°
- 45°
- 60°
- 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

- 4
- 5
- 6
- 8

16. The study of fossils is known as

- Ethnology
- Palaeontology
- Synecology
- Omboiology

17. Who has been elected as the President of Cricket Association of Bengal (CAB) in 2015 ?

- Sourav Ganguly
- Anil Kumble
- Sunil Gavaskar
- Mohd. Azharuddin

18. Which company committed to invest \$150 million for the Indian Startups during the Indian Prime Minister's Sept., 2015 US trip ?

- Qualcomm
- Yahoo
- Google
- Microsoft

19. What is the name of the Second Guided Missile Destroyer which has been commissioned into Indian Navy recently ?

- INS Vajram
- INS Kochi
- INS Kolkata
- INS Mumbai

20. Which cities hosted South Asian Games in January 2016 ?

- Bhopal and Jaipur
- Mumbai and Kolkata
- New Delhi and Pune
- 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 ?

- France
- India
- Germany
- 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 ?

- Hyderabad
- Amaravati
- Vishakhapatnam
- None of the above options.

23. Garampani sanctuary is located at

- Junagarh, Gujarat
- Diphu, Assam
- Kohima, Nagaland
- Gangtok, Sikkim

24. Ashoka's 'Dhamma' or 'Law of Piety'

- had the essence of all religions
- was a revolt against inefficiency in the Buddhist Sangha
- was a new religion which he founded after the Kalinga War
- 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 ?

- US and Russia
- US and France
- Russia and China
- 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 ?

- China
- Japan
- UAE
- South Korea

27. Daniel Ortega has been sworn in for a third consecutive term as President of which Central American Country ?

- Costa Rica
- Honduras
- Nicaragua
- 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 ?

- Indira Gandhi International (IGI) Airport, Delhi
- Babasaheb Ambedkar International Airport, Nagpur
- Sardar Vallabhbhai Patel International Airport, Ahmedabad
- 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 :

EME | mmm | EWE | W ? W

M E W E ? W

(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

A

-7-

SC - B



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

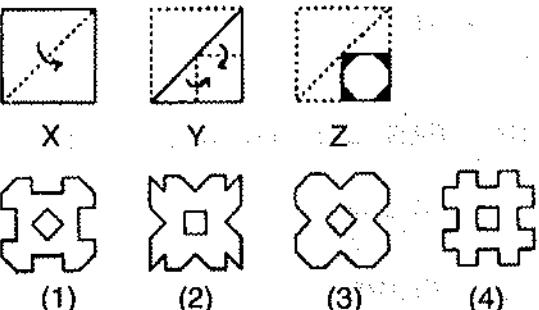
43. Two students appeared at an examination. One of them secured 9 marks more than the other and his marks were 56% of the sum of their marks. The marks obtained by them are  
A) 39, 30  
B) 41, 32  
C) 42, 33  
D) 43, 34

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).



X Y Z (1) (2) (3) (4)

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

**SPACE FOR ROUGH WORK**

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

52. Find the best correction for the underlined sentence from the four options given below: Under a provision of the Constitution that was never applied, Congress has been required to call a convention for considering possible amendments to the document when formally asked to do it 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, Shaktya 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 ?

- Y is married to C who is an engineer
- Z is married to C who is a doctor
- X is married to a doctor
- 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.

- DCAB
- ABCD
- BDAC
- DCBA

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

Bombast is when high sounding words for effect, not suitability, are used.

- is when high sounding words for effect, not suitability, are used
- is the use of high-sounding words for effect rather than for suitability
- is where high-sounding words are used for effect not suitability
- 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**

- feckless
- yielding
- sombre
- 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

- taunt : provoke
- inception : termination
- juggernaut : crush
- obstinate : preserve

## SPACE FOR ROUGH WORK



## SECTION – B

## ELECTRONICS AND COMMUNICATION/ELECTRONICS AND TELECOMMUNICATION

Choose the most appropriate option.

61. What is another name for one-shot multivibrator ?

- Monostable
- Astable
- Bistable
- None of the above options

62. What is one disadvantage of an S-R flip-flop ?

- It has no Enable input
- It has a RACE condition
- It has no clock input
- It has single output

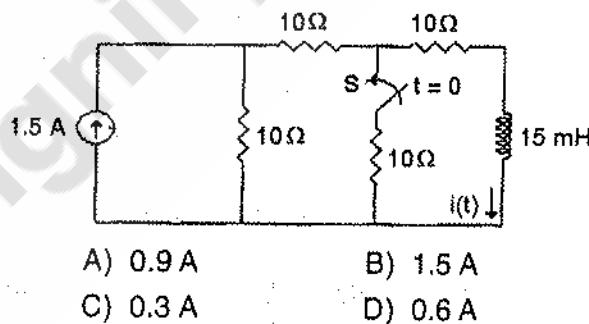
63. In two's complement system, add the signed numbers 11110010 and 11110011. Determine, in decimal, the sign and value of each number and their sum.

- 14 and -13; -27
- 13 and -12; -25
- 27 and -13; -40
- 2 and -3; -5

64. A 4-bit R/2R digital-to-analog (DAC) converter has a reference of 5 volts. What is the analog output for the input code 0101 ?

- 0.3125 V
- 3.125 V
- 0.78125 V
- None of the above options

65. In the circuit shown below, switch S is open for a long time and is closed at  $t = 0$ . The value of current  $i(t)$  when  $t \rightarrow \infty$  is



- 0.9 A
- 1.5 A
- 0.3 A
- 0.6 A

66. Consider a unity feedback control system with open-loop transfer function

$$G(s) = \frac{K}{s(s+1)}$$

The steady state error of the system due to a unity step input is.

- Zero
- $K$
- $1/K$
- Infinite

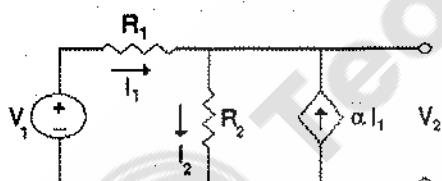
## SPACE FOR ROUGH WORK

67. Match the application to appropriate numerical method.

Application	Numerical Method
P1 : Numerical integration	M1 : Newton-Raphson Method
P2 : Solution to a Transcendental equation	M2 : Runge-Kutta Method
P3 : Solution to a system of linear equations	M3 : Simpson's 1/3 rule
P4 : Solution to a differential equation	M4 : Gauss Elimination Method

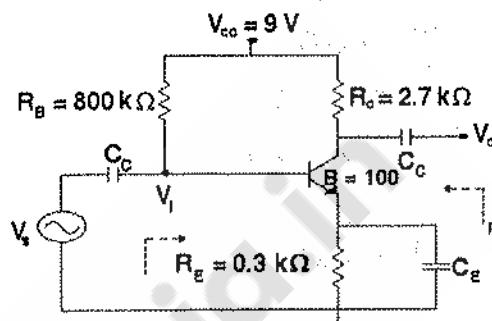
A) P1 – M3, P2 – M2, P3 – M4, P4 – M1  
 B) P1 – M3, P2 – M1, P3 – M4, P4 – M2  
 C) P1 – M4, P2 – M1, P3 – M3, P4 – M2  
 D) P1 – M2, P2 – M1, P3 – M3, P4 – M4

68. For  $\alpha = -1$ , the value of  $V_2$  is



A)  $\infty$   
 B) 0  
 C)  $V_1$   
 D) None of the above options

69. The amplifier circuit shown below uses a silicon transistor. The capacitors  $C_E$  and  $C_E$  can be assumed to be short at signal frequency and the effect of output resistance  $r_o$  can be ignored. If  $C_E$  is disconnected from the circuit, which one of the following statements is TRUE ?



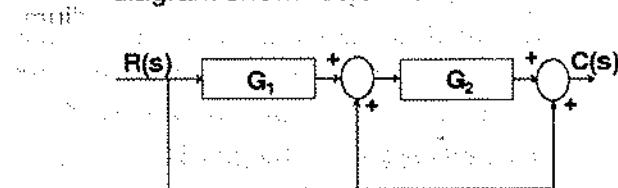
A) The input resistance  $R_i$  increases and voltage gain  $A_v$  decreases  
 B) The input resistance  $R_i$  decreases and voltage gain  $A_v$  increases  
 C) Both input resistance  $R_i$  and voltage gain  $A_v$  decreases  
 D) Both input resistance  $R_i$  and voltage gain  $A_v$  increases

70. The value of X in the expression given below is  $(2)_3 + (3)_4 = (X)_5$

A) 5  
 B) 11  
 C) 18  
 D) 10

SPACE FOR ROUGH WORK

71. The transfer function  $C(s)/R(s)$  in the block diagram shown below is



A)  $\frac{G_1G_2}{1+G_1G_2}$

B)  $G_1G_2 + G_1 + 1$

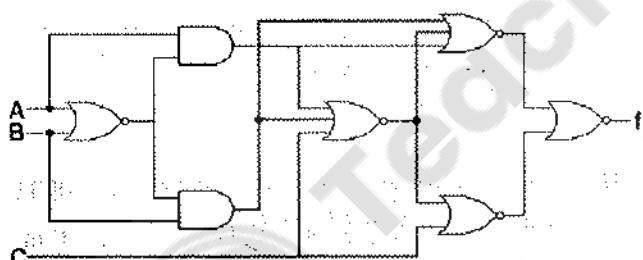
C)  $G_1G_2 + G_2 + 1$

D)  $\frac{G_1}{1+G_1G_2}$

72. If the characteristic equation of a closed loop system is  $s^2 + 2s + 2$ , then the system is

- A) over damped
- B) critically damped
- C) under damped
- D) undamped

73. The following circuit can be represented as



- A)  $f(A, B, C) = C$
- B)  $f(A, B, C) = \sum(0, 1, 2, 5, 6, 7)$
- C)  $f(A, B, C) = \sum(0, 2, 4, 6)$
- D) None of the above options

74. A two port network is described by the relation

$$V_1 = 2I_1 + 3V_2$$

$$I_2 = -I_1 + 2V_2$$

Then Z-parameter of such network is:

A) 
$$\begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix}$$

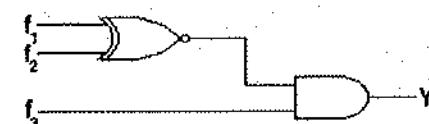
B)  $\begin{bmatrix} 3.5 & 1.5 \\ 0.5 & 0.5 \end{bmatrix}^{-1}$

c)  $\begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix}^{-1}$

D)  $\begin{bmatrix} 3.5 & 1.5 \\ 0.5 & 0.5 \end{bmatrix}$

75. Find  $Y$  in the circuit below where  $f_1$ ,  $f_2$  and  $f_3$  given as

$$f_1(C, D) = \Sigma(0, 1, 2, 3), f_2(A, B, C, D) = \Sigma(0, 1, 2, 3, 5, 6, 9), f_3(A, B, C, D) = \prod(4, 7, 8, 10, 11, 12, 13, 14, 15)$$



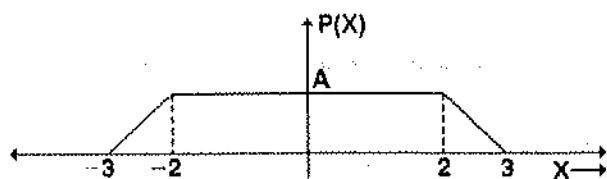
- A)  $f_2$
- B)  $f_3$
- C) 0
- D)  $\sum(0, 1, 2, 3, 5, 6, 9)$

#### SPACE FOR BOUGH WORK

76. For real values of  $x$ , the minimum value of  $f(x)$  given by  $\exp(x) + \exp(-x)$  is

A) 2  
B) 1  
C) 0.5  
D) 0

77. The probability density function of a random variable  $x$  is as shown



The value of A shown in the figure is

A) 1/3  
B) 1/4  
C) 1/5  
D) 1/6

78. An 8 level encoding scheme is used in a PCM system of 10 kHz channel BW. The channel capacity is

A) 80 kbps  
B) 60 kbps  
C) 30 kbps  
D) 18 kbps

79. For static electric and magnetic fields in an homogenous source-free medium, which of the following represents the correct form of Maxwell's equations ?

A)  $\nabla \cdot \mathbf{E} = 0, \nabla \times \mathbf{B} = 0$   
B)  $\nabla \cdot \mathbf{E} = 0, \nabla \cdot \mathbf{B} = 0$   
C)  $\nabla \times \mathbf{E} = 0, \nabla \times \mathbf{B} = 0$   
D)  $\nabla \times \mathbf{E} = 0, \nabla \cdot \mathbf{B} = 0$

80. Rank of the matrix given below is

$$\begin{bmatrix} 1 & 4 & 5 & 3 \\ 4 & 16 & 20 & 12 \\ -1 & -4 & -5 & -3 \end{bmatrix}$$

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

81. The resolution of a 4-bit counting ADC is 0.5 volts. For an analog input of 6.6 volts, the digital output of the ADC will be

A) 1011  
B) 1000  
C) 1100  
D) 1110

82. The 4-point Discrete Fourier Transform (DFT) of a discrete time sequence  $\{1, 0, 2, 3\}$  is

A)  $[0, -2+2j, 2, -2-2j]$   
B)  $[2, 2+2j, 6, 2-2j]$   
C)  $[6, 1-3j, 2, 1+3j]$   
D)  $[6, -1+3j, 0, -1-3j]$

#### SPACE FOR ROUGH WORK

A

-15-

SC - B



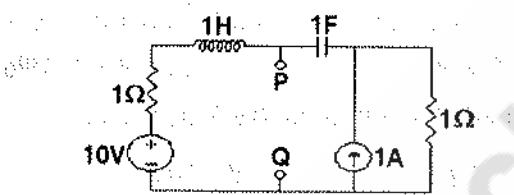
83. The distance between target and radar is reduced to half. Power received is

- decreased by 16 times
- decreased by 4 times
- increased by 4 times
- increased by 16 times

84. The Causal system given by  $H(z) = 6 + z^{-1} - z^{-2}$  is

- maximum phase
- minimum phase
- mixed phase
- none of the above options

85. The Thevenin impedance  $Z_{th}$  between the nodes P and Q in the circuit is

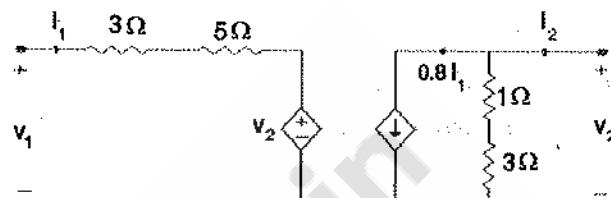


- 1
- $1 + s + \frac{1}{s}$
- $2 + s + \frac{1}{s}$
- $\frac{s^2 + s + 1}{s^2 + 2s + 1}$

86. If the memory chip size is  $256 \times 1$  bits, then the number of chips required to make up 1 KB (1024) bytes of memory is

- 32
- 24
- 12
- 8

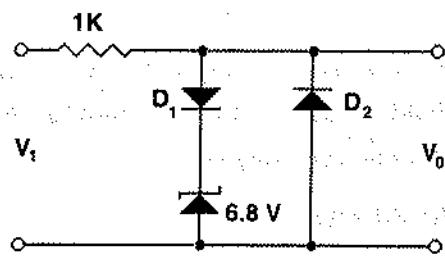
87. The common emitter model is shown below



The h-parameters of this model are

- $\begin{bmatrix} 8 & 1 \\ 0.8 & 0.25 \end{bmatrix}$
- $\begin{bmatrix} 5 & 1 \\ 0.8 & 1 \end{bmatrix}$
- $\begin{bmatrix} 8 & 0.8 \\ 1 & 0.25 \end{bmatrix}$
- $\begin{bmatrix} 5 & 0.8 \\ 1 & 1 \end{bmatrix}$

88. In the following limiter circuit, an input voltage  $V_i = 10 \sin 100\pi t$  is applied. Assume that the diode drop is 0.7 V when it is forward biased. The Zener breakdown voltage is 6.8 V.



The maximum and minimum values of the output voltage respectively are

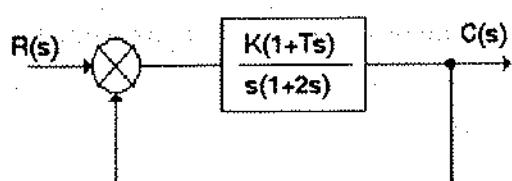
- 6.1 V, -0.7 V
- 0.7 V, -7.5 V
- 7.5 V, -0.7 V
- 7.5 V, -7.5 V

SPACE FOR ROUGH WORK

89. Four signals  $m_1(t) = \cos(\omega_0 t)$ ,  $m_2(t) = 0.5\cos(\omega_0 t)$ ,  $m_3(t) = 2\cos(\omega_0 t)$  and  $m_4(t) = \cos(4\omega_0 t)$  are multiplexed by Time Division Multiplexing system. The commutator speed is

A)  $2f_0$   
B)  $3f_0$   
C)  $4f_0$   
D)  $8f_0$

90. The feedback control system shown in figure is stable for values of K and T

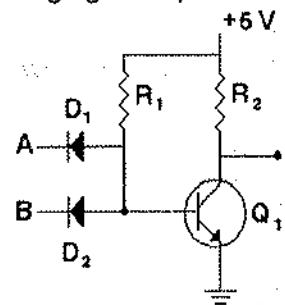


A)  $K < 0, T > -1$   
B)  $K > 0, T > 0$   
C)  $K > 0, T > -1$   
D)  $K < 0, T > 0$

91. A  $\lambda/4$  long high frequency transmission line is terminated into one impedance  $Z_R$ . If  $Z_0$  be the characteristic impedance of the line, then input impedance  $Z_{in}$  is

A)  $Z_0 Z_R$   
B)  $Z_R / Z_0$   
C)  $Z_0^2 / Z_R$   
D) Infinity

92. Following figure represents

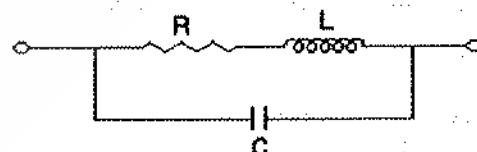


A) AND  
B) OR  
C) NAND  
D) XOR

93. For parallel RLC circuit, which one of the following statements is NOT correct?

A) The bandwidth of the circuit decreases if R is increased  
B) The bandwidth of the circuit remains same if L is increased  
C) At resonance, input impedance is a real quantity  
D) At resonance, the magnitude of input impedance attains its minimum value

94. The expression for resonant frequency  $\omega_0$  for the circuit given below is



A)  $\frac{1}{\sqrt{LC}}$   
B)  $\frac{1}{\sqrt{LC}} \sqrt{1 - \frac{R^2 C}{L}}$   
C)  $\frac{1}{\sqrt{LC}} \sqrt{\frac{R^2 L}{C}}$   
D) None of the above options

SPACE FOR ROUGH WORK



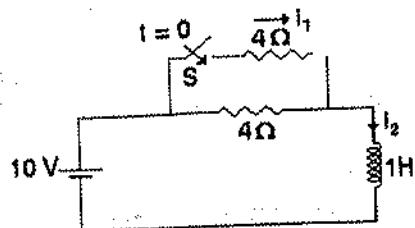
95. For function  $f(t)$  given below

$$f(t) = L^{-1} \left[ \frac{3s+1}{s^3 + 4s^2 + (K-3)s} \right]$$

Find the value of K, if  $\lim_{x \rightarrow \infty} f(t) = 1$ .

A) 1      B) 2  
C) 3      D) 4

96. Find  $i_1(t)$  for  $t > 0$



A)  $2.5 - 2.5e^{-2t}$   
B)  $2.5 - 1.25e^{-2t}$   
C)  $1.25 - 1.25e^{-2t}$   
D) None of the above options

97. Which of the following terms are equivalent?

1)  $A \oplus B \oplus C$     2)  $A \oplus B \odot C$   
3)  $A \odot B \oplus C$     4)  $A \odot B \odot C$

A) 1 and 4; 2 and 3  
B) 1 and 3  
C) 2 and 3  
D) 1, 2 and 4

98. The Fourier transform of a double sided exponential function  $e^{-\frac{1}{2}|t|}$  is

A)  $\frac{2}{1+4\omega^2}$   
B)  $\frac{1+4\omega^2}{4}$   
C)  $\frac{1+4\omega^2}{2}$   
D)  $\frac{4}{1+4\omega^2}$

99. A uniform plane magnetic wave incident normally on a plane surface of a dielectric material is reflected and the percentage of reflected power is 64%. What is VSWR?

A) 9  
B) 6.4  
C) 0.8  
D) 1

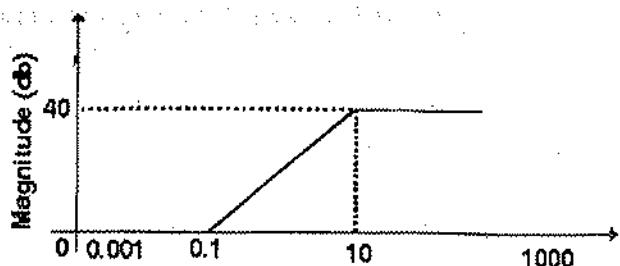
100. A communication channel with AWGN operating at a signal to noise ratio  $\text{SNR} \gg 1$  and bandwidth B has capacity  $C_1$ . If the SNR is doubled keeping B constant, the resulting capacity  $C_2$  is given by

A)  $C_2 \approx 2C_1$   
B)  $C_2 \approx C_1 + B$   
C)  $C_2 \approx C_1 + 2B$   
D)  $C_2 \approx C_1 + 0.3B$

### SPACE FOR ROUGH WORK

A    3

101. For the asymptotic Bode magnitude plot shown below, the system transfer function can be



A)  $\frac{10s+1}{0.1s+1}$   
 B)  $\frac{100s+1}{0.1s+1}$   
 C)  $\frac{100s}{10s+1}$   
 D)  $\frac{0.1s+1}{10s+1}$

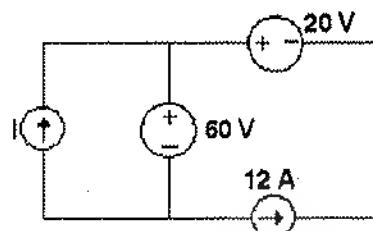
102. A certain JK FF has  $t_{pd} = 12$  nsec. The largest MOD number of ripple counter that can be constructed from these FFs and still operate up to 10 MHz is

A) 12      B) 8  
 C) 256      D) 10

103. The open-loop DC gain of a unity negative feedback system with closed-loop transfer function  $(s+4)/(s^2 + 7s + 13)$  is

A) 4/13      B) 4/9  
 C) 4      D) 13

104. In the interconnection of ideal sources shown in the figure, it is known that the 60V source is absorbing power.



Which of the following can be the value of the current source with least absorbing power?

A) 10      B) 13  
 C) 15      D) 18

105. In a JK flip-flop,  $J$  is connected to  $\bar{Q}$  and  $K$  is connected to  $Q$  outputs. The JK FF converts into a

A) RS FF  
 B) D FF  
 C) T FF  
 D) Clocked RS FF

106. The input and output of a continuous time system are respectively denoted by  $x(t)$  and  $y(t)$ . Which of the following descriptions correspond to a causal system?

A)  $y(t) = x(t-2) + x(t+4)$   
 B)  $y(t) = (t-4)x(t+1)$   
 C)  $y(t) = (t+4)x(t-1)$   
 D)  $y(t) = (t+5)x(t+5)$

SPACE FOR ROUGH WORK

A

-19-

SC - B



107. If the function X, Y are  $X = R + P'Q + R'S$  and  $Y = P'Q' R' S' + P Q R' S' + P Q' R S'$  (where ' represent complement). Which of the following is true ?

- $X = Y$
- $X = Y'$
- no direct relation between X and Y
- insufficient data

108. In 8085, whenever a signal is received at TRAP terminal its program execution is transferred to a subroutine on address

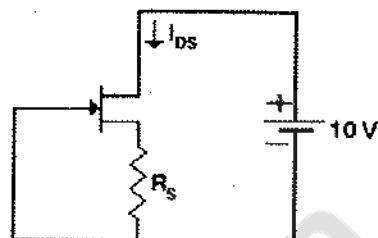
- 0000 H
- 0024 H
- 002C H
- None of the above options

109. The impulse response  $h[n]$  of a linear time-invariant system is given by  

$$h[n] = u[n+3] + u[n-2] - 2u[n-7]$$
The above system is

- Stable but not causal
- Stable and causal
- Causal but unstable
- Unstable and not causal

110. The JFET in the circuit shown in figure has an  $I_{DSS} = 10 \text{ mA}$  and  $V_p = -5 \text{ V}$ . The value of the resistance  $R_s$  for a drain current  $I_{DS} = 6.4 \text{ mA}$  is (select the nearest value)



A)  $156 \Omega$

B)  $150 \Omega$

C)  $560 \Omega$

D)  $1000 \Omega$

111. A system described by the following differential equation is initially at rest

$$\frac{d^2y}{dt^2} + 3 \frac{dy}{dt} + 2y = x(t)$$

For input  $x(t) = 2u(t)$ , the output  $y(t)$  is

A)  $(1 - 2e^{-t} + e^{-2t})u(t)$

B)  $(1 + 2e^{-t} - 2e^{-2t})u(t)$

C)  $(0.5 + e^{-t} + 1.5e^{-2t})u(t)$

D)  $(0.5 + 2e^{-t} + 2e^{-2t})u(t)$

SPACE FOR ROUGH WORK

A

-20-

SC - B

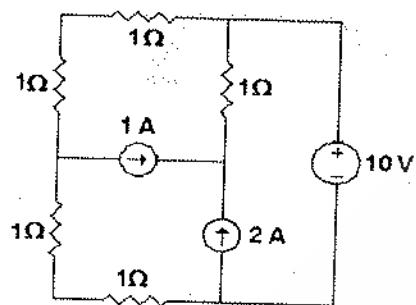


112. Compute the value of the expression given below, where  $i$  represents the base of number system, will be

$$\sum_{i=2}^9 (10)_i$$

A) 10  
B) 25  
C) 36  
D) 44

113. In the circuit shown, the power supplied by the voltage source is



A) 0 W  
B) 5 W  
C) 10 W  
D) 100 W

114. The system with given transfer function given below will be

$$H(z) = \frac{3z^3 + 4z^2 + z}{3z^2 - 10z + 3}$$

A) causal  
B) anticausal  
C) both sided  
D) non causal

115. Consider the frequency modulated signal  $10 \cos(2\pi \cdot 10^5 t) + 5 \sin(2\pi \cdot 1500t) + 7.5 \sin(2\pi \cdot 1000t)$  with carrier frequency of  $10^5$ Hz. The modulation index is

A) 12.5  
B) 10  
C) 7.5  
D) 5

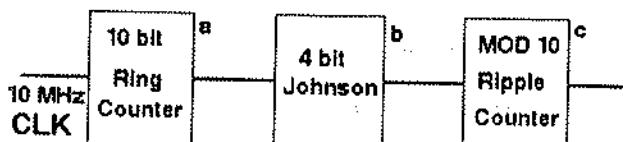
116. NMOS devices have \_\_\_\_\_ switching speeds and \_\_\_\_\_ on-state resistance; as compared with PMOS devices.

A) slower, higher  
B) faster, lower  
C) faster, higher  
D) slower, lower

### SPACE FOR ROUGH WORK



117. What is the frequency of pulse at the points c in the circuit ?



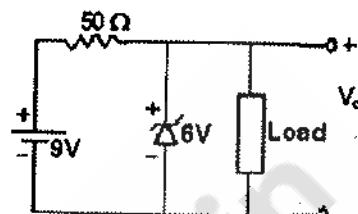
- A) 3 MHz
- B) 12.5 KHz
- C) 10 KHz
- D) 1 MHz

118. The Eigen values of  $A^2$  where matrix A is defined as

$$\begin{bmatrix} -1 & 0 & 0 \\ 2 & -3 & 0 \\ 1 & 4 & 2 \end{bmatrix}$$

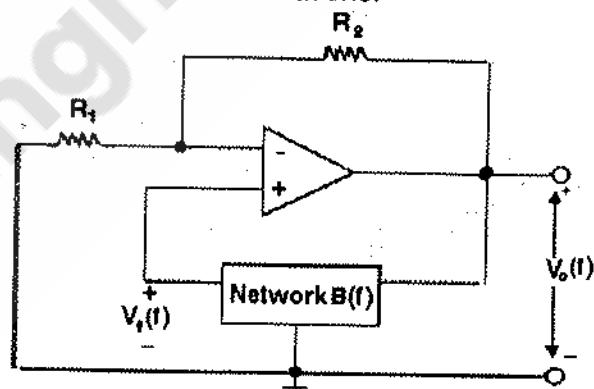
- A) -1, -9, -4
- B) 1, 9, 4
- C) 1, 3, -2
- D) -1, -3, 2

119. A Zener diode in the circuit shown has a knee current of 5 mA, and maximum allowed power dissipation of 300 mW. What are the minimum and maximum load current (in mA) that can be drawn safely from the circuit, keeping the output voltage  $V_o$  constant at 6 V ?



- A) 5, 180
- B) 5, 110
- C) 10, 55
- D) 55, 60

120. The circuit shown below employs +ve feedback and is intended to generate sinusoidal oscillations.



If at a frequency  $f_0$ , feedback factor  $\beta(f) = V_f(f) / V_o(f) = 1/6$ , then to sustain oscillation at this frequency is

- A)  $R_2 = 6R_1$
- B)  $R_2 = 5R_1$
- C)  $R_2 = R_1/6$
- D)  $R_2 = R_1/5$

SPACE FOR ROUGH WORK

A

-22-

SC - B

