MEGA MOCK CHALLENGE

gradeup

VIZAG

Steel Management Trainee 2020

Electrical Engineering

Mega Mock Challenge

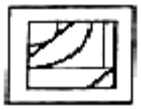
(Apr. 25- Apr. 26 2020)

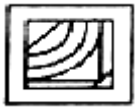
Questions & Solutions

1. **Direction**: In each of the following questions, which answer figure will complete the question figure?

Question Figure:

A. 

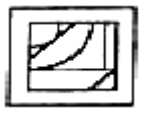
B. 

C. 

D. 

Ans. B

Sol. After observing the given question figure, it is clear that option figure B will complete the given question figure.



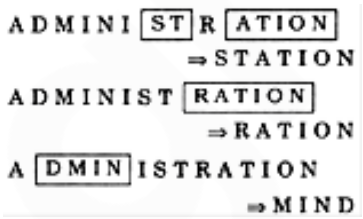
2. In the following question, select the word which cannot be formed using the letters of the given word.

ADMINISTRATION

A. STATION
B. RATION
C. MINISTER
D. MIND

Ans. C

Sol. There is no 'E' letter in the given word. Therefore, the word MINISTER cannot be formed.



Hence, option C is the correct response.

3. **Direction**: Which of the following words will come fourth if arranged according to the English dictionary?

A. Rain
B. Reef
C. Ready
D. Rainbow

Ans. B

Sol. Rain → Rainbow → Ready → Reef

Clearly, Reef will come fourth.

Hence, B is correct.

4. Identify the diagram that best represents the relationship among the given classes.

Teachers, Singers, Boys

A. 

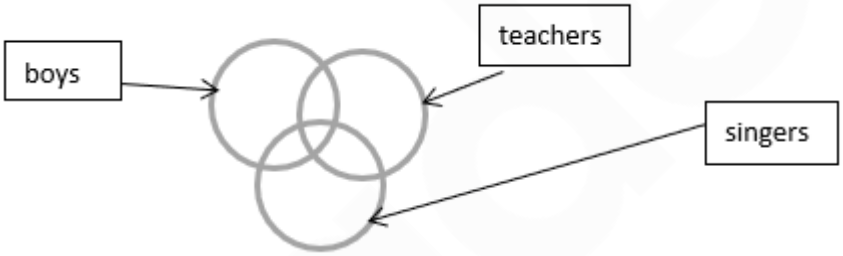
B. 

C. 

D. 

Ans. C

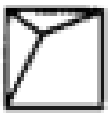
Sol. Some boys can be teachers. Some teachers can be singer. Some singers can be boys. So, the given class are partly related to each other. Hence, option C is the right answer.



5. **Directions**: In the following questions, which answer figure will complete the question figure?

Question figure:

A. 

B. 

C. 

D. 

Ans. D

Sol. After observing the given question figure, it is clear that, answer figure (D) will be complete the given pattern.

Hence, d is correct.

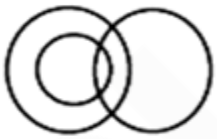
6. Identify the diagram that best represents the relationship among the given classes.

Men, Author, teacher

A. 

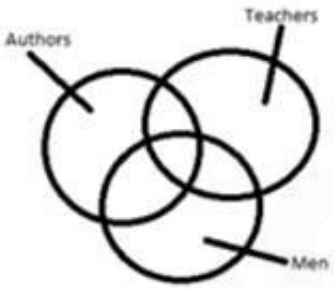
B. 

C. 

D. 

Ans. A

Sol. Some authors can be teachers. Some teachers can be men. Some authors can be men. So, the given items are partly related to each other. Thus,



Hence, option A is the correct response.

7. In the following question, select the related word from the given alternatives.

Bee : Honey :: Cow:?

A. Animal
B. Grass
C. Milk
D. Water

Ans. C

Sol. Honey is obtained from bees. Similarly, milk si obtained from cows.

Hence, option C is the correct response.

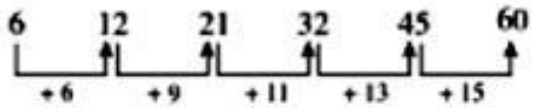
8. Find the wrong number in the series.

6, 12, 21, 32, 45, 60

A. 6
B. 12
C. 21
D. 32

Ans. A

Sol. 6, 12, 21, 32, 45, 60



Clearly, 6 is the wrong number in the given series.

Hence, option A is correct.

9. **Direction:** In the question given below there is a statement followed by two conclusions numbered I and II. You have to assume everything in the statement to be true. Then consider the 2 conclusions together and decide which of them follows beyond a reasonable doubt from the information given in the statement.

Statement:

One can master the English language only through extensive reading and constant use of the language through writing and conversing.

Conclusions:

I. People who do not read English books cannot master the language fully.

II. Only reading is not enough, one needs to practise speaking and writing in the language to master it.A. Only conclusion I follows

B. Only conclusion II follows

C. Both conclusion I and II follows

D. Neither conclusion I nor II follows

E. Either conclusion I nor II follows

Ans. C

Sol. One cannot learn complete command over the language without reading books or articles in that language. His/her knowledge regarding the usage will be incomplete. So I conclusion follows. Conclusion II also follows as the practice makes a man perfect. Without using the language accumulated by reading by conversing and writing one will not master the language.

10. Equations given below are solved on the basis, of a certain system. On the same basis, find out the correct answer for the unsolved equation.

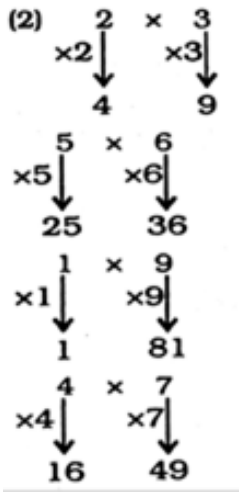
$2 \times 3 = 49$, $5 \times 6 = 2536$, $1 \times 9 = 181$, $4 \times 7 = ?$

A. 1628 B. 1649

C. 2549 D. 1219

Ans. B

Sol.



Hence, option B is the right answer.

11. Arrange the given words in the sequence in which they occur in the dictionary.

1). Manifest

2). Meticulous

3). Meridian

4). Merchant

A. 1,4,3,2 B. 2,1,4,3

C. 1,3,2,4 D. 2,3,4,1

Ans. A

Sol. The correct order of the words is,

1). Manifest

4). Merchant

3). Meridian

2). Meticulous

→ 1, 4, 3, 2

12. **Direction**: If LUXOR is coded as 30, then GUILDS will be coded as?

A. 36 B. 38

C. 24 D. 40

Ans. C

Sol. LUXOR : 12, 21, 24, 15, 18 = 90 (sum) 90/3 =30)

Similarly

GUILDS : 7, 21, 9, 12, 4, 19 = 72 sum hence 72/3= 24

13. In the following question, select the odd word from the given alternatives.

A. Japanese B. Italian

C. French D. German

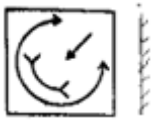
Ans. A

Sol. Japanese is an Asian country language, while Italian, French and German are European country languages.

Hene, option A is different from others.

14. If a mirror is placed on the line MN, then which of the answer figures is the right image of the given figure?

M



N

A. 

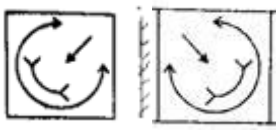
B. 

C. 

D. 

Ans. B

Sol. After observation the given question figure, Since, MN is the mirror line, then after reflection right portion of the question figure should be shown in left side in the reflected image, similarly, left portion of the question figure should be shown in right side in the reflected image.



Hence, b is correct.

15. In the following question, select the related group of letters from the given alternatives.

CUZA : HYCC : : NNJO : ?

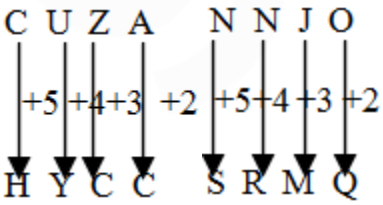
A. TURS

B. SRMQ

C. TRMP

D. SSNR

Ans. B

Sol. 

Hence, option B is the right answer.

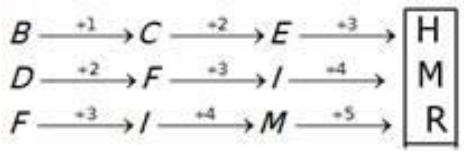
16. A series is given with one term missing. Select the correct alternative from the given ones that will complete the series.

BDF, CFI, EIM, ?

A. AEH
B. HMR
C. KPS
D. RVZ
E. HPR

Ans. B

Sol. The series will be,



Hence, option B is the correct answer.

17. In the following question, select the word which cannot be formed using the letters of the given word.

SPECULATION

A. SPECIAL
B. TOPIC
C. SECULAR
D. CAUTION

Ans. C

Sol. Except C (SECULAR), all the given word can be formed by using the letters of the given word' SPECULATION'. Since, letter 'R' do not come in the word 'SPECULATION'.

18. In the following question, select the related letters from the given alternatives.

AZBY : CXDW : : EVFU : ?

A. GTHS
B. GHTS
C. GSTH
D. TGSH

Ans. A

Sol. With reference to the position of the alphabets in the English Alphabet series.

Alphabet	A	B	C	D	E	F	G	H	I	J	K	L	M
Position value	1	2	3	4	5	6	7	8	9	10	11	12	13
Alphabet	Z	Y	X	W	V	U	T	S	R	Q	P	O	N
Position value	26	25	24	23	22	21	20	19	18	17	16	15	14

Pairs of consecutive opposite letters are,

AZ, BY; CX, DW; EV,FU; GT, HS.

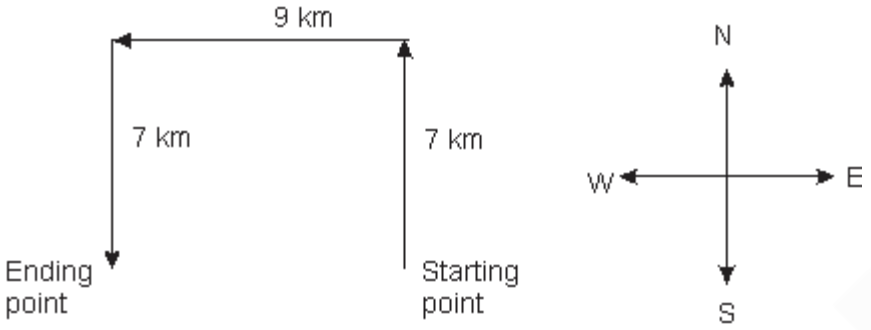
Hence, option A is the right answer.

19. Lata walks 7 km towards North, turns to her left and walks 9 km, again she turns to her left and walks 7 km. How far is she from the starting point?

A. 9 km
B. 6 km
C. 8.km
D. 7 km

Ans. A

Sol.



Hence, she is 9 km far from the starting point.

20. Statement is given followed by two conclusions I and II. You have to consider the statement to be true even they seem to be at variance from commonly known facts. You have to decide which of the given conclusions, if any, follows from the given statement.

Statement:

The manager humiliated Sachin in the presence of his colleagues.

Conclusions:

I. The manager did not like Sachin.

II. Sachin was not popular with his colleagues.

A. Only conclusion I follows
B. Only conclusion II follows
C. Both conclusion I and II follow
D. Neither conclusion I nor II follows

Ans. D

Sol. Clearly, none of the given conclusions is either mentioned in or can be drawn from the facts given in the statement. Hence, the answer is (D).

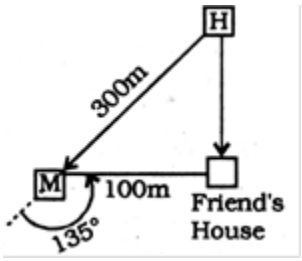
Hence, option D is the correct answer.

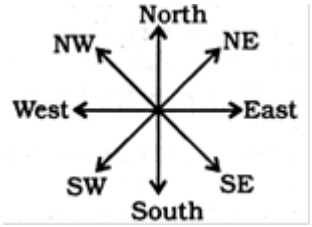
21. Rahim rode on his bicycle from his house towards the market for 300 m. He was moving south-west. Then he turned left at an angle of 135° and rode for 100 m to visit a friend. In which direction is Rahim's house located from his friend's house ?

A. North
B. East
C. West
D. South

Ans. A

Sol.





It is clear from the diagram that the house of Rahim is to the north of the house of his friend.

22. A series is given with one term missing. Select the correct alternative from the given ones that will complete the series.

124, 235, 346, 457, ?

A. 455 B. 465

C. 565 D. 568

Ans. D

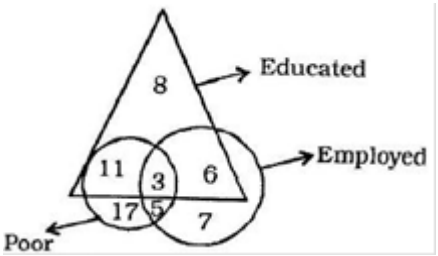
Sol. 124 + 111 = 235

235 + 111 = 346

346 + 111 = 457

So, missing number = 457 + 111 = 568

23. The figure represents three classes of youth in a village. How many educated youth are poor?

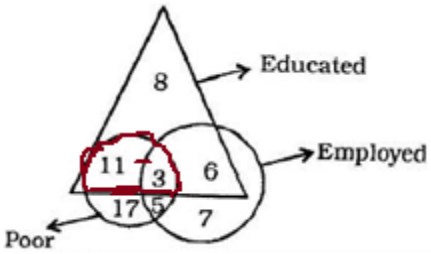


A. 14 B. 9

C. 6 D. 19

Ans. A

Sol.



11+3 = 14, educated youth who are poor.

Hence, option A is the correct response.

24. **Direction:** Find the odd number/ letter/ word from the given alternatives.

A. Bird
B. Crow
C. Kite
D. Pigeon

Ans. C

Sol. All the rest are the names of birds.

25. In a certain system A = 15(56)13, B = 17(50)8. What should be filled in the place of * to follow the same in C = 9(32)*

A. 6
B. 4
C. 3
D. 7

Ans. D

Sol. According to given system,

A = 15(56)13 => 15 + 13 = 28 => 28 × 2 = 56

B = 17(50)8 => 17 + 8 = 25 => 25 × 2 = 50

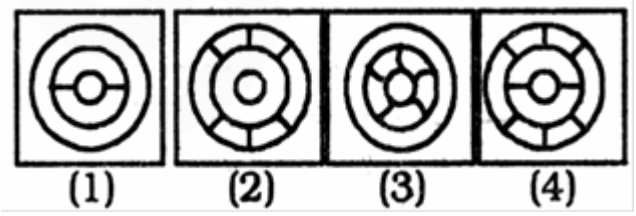
Similarly, C = 9(32) * => 9 + 7 => 16 × 2 = 32

Hence, option D is the right answer.

26. From the given answer figures, select the one in which the question figure is hidden/embedded.

Question Figure

Answer Figure



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

Ans. D

Sol. After observing the given question figure, it is clear that option figure D is embedded in the given figure.

27. **Direction**: Select the related word/letters/ number from the given alternatives.

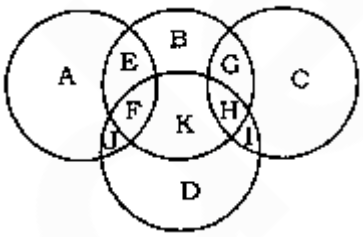
Scissors : Cloth :: ?

A. Pen : Ink
B. Razor : Beard
C. Furnace : Smoke
D. Nail: Hammer

Ans. B

Sol. 'Scissors' are used to cut 'Cloth'. Similarly 'Razor' is used to shave 'Beard'.
Hence Option B is correct

28. 'A' represents persons who talk Tamil, 'B' represents persons who talk Telugu, 'C' represents persons who talk Kannada, 'D' represents persons who talk Hindi.
How many persons can talk in any 3 language?



A. F, H
B. F, K
C. K, I
D. h, K

Ans. A

Sol. F and H talks three languages. F is common to circle A, B and D. H is common to circle C, D and B.
Hence, option A is the right answer.

29. Ann, Bill and Ken shared some stamps in the ratio 2 : 3 : 4. After a game, the ratio became 5 : 2 : 2. If Ann won 21 stamps, how many did ken lose?

A. 14
B. 21
C. 28
D. 7

Ans. A

Sol. Let Ann, Bill and Ken had 2x, 3x and 4x stamps respectively, after a game the stamp became 5x, 2x and 2x respectively
According to the question,
5x-2x=21
$\Rightarrow 3x = 21 \Rightarrow x = 7$

∴ Numbers of stamps lost by ken

$= 4x - 2x$

$= 2x = 2 \times 7 = 14$

Hence, option A is the right answer.

30. Which one set of letters when sequentially placed at the gaps in the given letter series shall complete it?

LU_TUPLUBTU_LUBT_P_UBTUP

A. BPUL
B. BUPL
C. LBPU
D. PBUL

Ans. A

Sol. The series is:

LU**B**TUP/LUBTU**P/**LUBT**U**P/**L**UBTUP.

Hence, option A is the right answer.

31. Find a word that is the synonym of -

A. TAMEA. Wild
B. savage
C. domesticated
D. silent

Ans. C

Sol. Tame = not dangerous or frightened of people; domesticated

Savage = extremely violent, wild, or frightening

Domesticated = tame and kept as a pet or on a farm

Hence, option C is the correct answer.

32. Improve the bracketed part of the sentence.

Mumbai is (larger) than many other towns in India.

A. large
B. largest
C. big
D. No improvement

Ans. D

Sol. The given sentence is correct. The rule with comparative degree is:

1. Comparative adjective + than + all/many other + noun (plural)
2. Comparative adjective + than + any other + noun (singular)

33. **Direction:** Read the following passage carefully and choose the best answer to each out of the four alternatives.

The arrival of the train did not disturb Sir Mohan Lal's sangfroid. He continued to sip his Scotch and ordered the bearer to tell him when he had moved the luggage to a first class compartment. Excitement, bustle and hurry were exhibitions of bad breeding and Sir Mohan was eminently well-bred. He wanted everything "tickety-boo" and orderly. In his five years abroad, Sir Mohan had acquired the manners and attitudes of the upper classes. He rarely

spoke Hindustani. When he did, it was like an Englishman's, only the very necessary words and properly anglicized. But he fancied his English, finished and refined at no less a place than the University of Oxford. He was fond of conversation and like a cultured Englishman, he could talk on almost any subject-books, politics or people. How frequently had he heard English people say that he spoke like an Englishman?

From his description in this passage, Sir Mohan Lal appears to be

A. A man of culture
B. An aristocrat
C. A snob
D. A scholar

Ans. C

Sol. As given in the passage, Sir Mohan Lal considered himself superior to other Indians. He rarely spoke Hindi as it considered it as inferior to English. He behaved like he is from a different higher class of society. He was the great admirer of English culture. In other words, we can call him a snob. A snob is someone who respects and likes only people who are of a high social class.

34. Select the most appropriate meaning of the idiom given in bold in the sentence.

For this act of indifference he will be **taken to task by** the authority.

A. to be reprimanded
B. to be rewarded
C. to ask for resignation
D. to be entrusted with an official job

Ans. A

Sol. The idiom "Take somebody to task" means to criticize somebody strongly for something they have done.

Hence option A is the correct answer.

35. According to the passage, a cultured Englishman is able to talk effortlessly on

A. Art and Culture
B. Human civilization
C. Modern Science
D. Almost any subject

Ans. D

Sol. Sir Mohan Lal was fond of conversation and like an Englishman, he could talk on almost any subject. Thus, option D is the correct answer.

36. Choose the correctly spelt word.

A. Rhapsody
B. Rhapsoady
C. Rapcody
D. Rapsody

Ans. A

Sol. Option A has the correctly spelt word. Rhapsody means an effusively enthusiastic or ecstatic expression of feeling.

37. **Direction:** In the following question, some part of the sentence have error and some have none. Find out which part of the sentence has an error. If the sentence is correct as it is, your answer is 'No error'.

Travel agents around the world have to rely on computers (A)/ to book seats in air flights or rooms in hotels (B)/ either now or a year from now. (C)/ No error

A. (A) B. (B)

C. (C) D. No error

Ans. B

Sol. The error is in part (B) of the sentence. The preposition should be "on" instead of "in".

38. Select the correct option to fill in the blank. |||End|||

He agreed _____ my business proposal.

A. at B. on

C. to D. for

Ans. C

Sol. The correct preposition to be used in the given sentence is "to". Hence, option C is the correct answer.

Explanation:

When you agree with someone/something, it means you accept the point of someone/something.

I agree with you.

She does not agree with my answer.

You agree on some issue or point of debate.

We agreed on this issue.

You agree to demands/queries, or you agree to do something.

He agreed to my demands.

He agreed to join me for the movie.

39. Select the word which means the same as the group of words given.

A written declaration of government or a political party.

A. Manifesto B. Affidavit

C. Dossier D. Document

Ans. A

Sol. Manifesto = a public declaration of policy and aims, especially one issued before an election by a political party or candidate.

Affidavit = a written statement confirmed by oath or affirmation, for use as evidence in court.

Dossier = a collection of documents about a particular person, event, or subject. Hence, the correct word is "manifesto".

40. Select the most appropriate antonym of the given word.
Permit
A. endorse
B. approve
C. certify
D. forbid

Ans. D

Sol. Permit means to allow someone to do something. The word which is opposite in meaning is "forbid" as it means to refuse to allow.
Endorse means declare one's public approval or support of.

41. **Choose the most appropriate alternative to complete the sentence:**
All of us are devoted _____ one another.
A. of
B. at
C. for
D. to

Ans. D

Sol. The verb "devote" is followed by the preposition "to". See below example:
He was entirely **devoted to** the affairs of his regimen.
So, option D is the correct answer.

42. Select the correctly spelt word.
A. Scarety
B. Scarcity
C. Scarsity
D. Scarecity

Ans. B

Sol. Option B has the correctly spelt word as "scarcity" which means insufficiency of amount or supply; shortage.

43. Select the most appropriate antonym of the given word. |||End|||
VIGOROUS
A. rough
B. rare
C. feeble
D. artful

Ans. C

Sol. Vigorous = strong, healthy, and full of energy.
The word opposite in meaning is "feeble" as it means lacking physical strength.
Artful = clever or skilful.

44. **Select the most appropriate meaning of the idiom underlined in the sentence.**
I tried <u>to feel his pulse</u> on the issue but in vain.
A. find his views
B. enlighten
C. argue with him
D. guide him

Ans. A

Sol. The idiom "feel the pulse" means try to determine the intentions or sentiments of a person.
Hence, option A is the correct answer.

45. When Sir Mohan/ Lal spoke Hindustani it was

A. Colloquial Hindi
B. Indian English
C. Literary Hindi
D. Anglicized Hindi

Ans. D

Sol. As per the following line of the passage, "He rarely spoke Hindustani. When he did, it was like an Englishman's, only the very necessary words and properly anglicized", we can say that the correct answer is option D.

46. According to Sir Mohan Lal, a wellbred person would

A. remain aloof from the crowd
B. like to drink only Scotch in public
C. always be calm and orderly
D. speak like an Englishman

Ans. C

Sol. Sir Mohan Lal believed that excitement, bustle and hurry were exhibitions of bad breeding. He considered himself as eminently well-bred and always behaved calmly and orderly.

47. Select the most appropriate option to substitute the bracketed segment in the given sentence. If no substitution is required, select No improvement.

All people want to be happy, **do they**?

A. don't they?
B. are they?
C. didn't they?
D. No improvement

Ans. A

Sol. When question tag is used in a sentence, it follows the rule of inversion. Inversion means that the verb is placed before the subject. Also, if the sentence is affirmative, the question tag must be negative and vice versa (except few cases).

Now, the first part of the sentence is affirmative, so, the question tag must be in negative form. In the given options, there are two choices with negative question tag. Option C is incorrect because the given sentence is in simple present tense. The correct answer is option A.

48. **One word substitution:**

People at a religious gathering

A. Rabble
B. Mob
C. Congregation
D. Crowd

Ans. C

Sol. Rabble = a large, noisy, uncontrolled group of people

Mob = a large crowd of people, especially one that is disorderly and intent on causing trouble or violence

Congregation = a group of people assembled for religious worship

So, the correct word is "congregation".

49. Sir Mohan Lal is portrayed as

A. An indophile
B. A true Englishman
C. A Hindu
D. An anglophile

Ans. D

Sol. In the passage, Sir Mohan Lal has been portrayed as someone who is a gread admirer of English culture and practise the same in his behaviour. He rarely spoke Hindi as he was fond of conversation in English language like a cultured Englishman. So, we can say that he was an anglophile.

50. In the following question, some part of the sentence may have errors. Find out which part of the sentence has an error and select the appropriate option. If the sentence is free from error, select 'No error'.

There were no furniture (1)/ in the flat (2)/ except for a couple of beds. (3)/ No error (4)

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

Ans. A

Sol. The error is in part (1) of the sentence. *Furniture* is a singular word, so, the associated verb should also be singular. The verb *were* is used for a plural noun, so, its use is incorrect in the given sentence. The correct verb would be *was*. The correct sentence would read as "*There was no furniture in the flat except for a couple of beds*".

51. India's First Freight village will be developed in which of the following places?

A. Chennai
B. Dehradun
C. Varnasi
D. Kolkatta
E. Chandigarh

Ans. C

Sol. India's first 'freight village' will be developed by the Inland Waterways Authority of India (IWAI) in Varanasi, Uttar Pradesh. The freight village, a one-of-its-kind infrastructure platform, will attract companies that require logistics services and can cluster to improve their competitiveness. This will allow relocation of retailers, warehouse operators and logistics service providers supplying the regional FMCG market. The facility will come around the proposed multi-modal terminal adjacent to the city on the banks of the Ganga

52. Who built the famous Shiva temple at Ellora?

A. Mauryan Emperor Ashoka
B. Gupta King Samudra Gupta
C. Chalukyan King Pulikeshi II
D. Rashtrakuta Ruler Krishna I

Ans. D

Sol. Rashtrakuta Ruler Krishna I was built the famous Shiva temple at Ellora. The massive Kailash Temple (cave 16) is nearly one a half times taller than the Parthnon and occupies almost twice its area. It is believed that it was constructed by excavating approx. 200,000 tones of rock and is possible the world's largest monolithic structure.

53. The main protein found in milk is _____

A. Albumin
B. Globulin
C. Globin
D. Casein

Ans. D

Sol.

- Casein is a protein commonly found in Mammalian milk, making 80% of the proteins in cow's milk and between 20-45% of the protein in human milk.
- Casein is used in making cheese, also as food additive, binder for safety matches etc.

54. Which of following Dam has been launched by the PM Narendra Modi at Rajkot, Gujrat?

A. Ukai Dam
B. Aji Dam
C. Kadana Dam
D. Sardar Sarovar Dam
E. None of these

Ans. B

Sol. The Prime Minister, Shri Narendra Modi has inaugurated the filling of 'Aji Dam' near **Rajkot** under Sauni Yojana.

55. Which of the following islands in India was once named "New Denmark"?

A. Elephanta Island
B. Salsatte Island
C. Lakshadweep
D. Nicobar Islands
E. None of these

Ans. D

Sol. In 1759, the Nicobar Islands were made a Danish colony, first named New Denmark and later as Frederick's Islands.

56. Which of the following is International Date Line?

A. 0 degree latitude
B. 0 degree longitude
C. Greenwich line
D. 180 degree longitude

Ans. D

Sol. The **International Date Line** is located halfway around the world from the prime meridian (0° longitude) or about 180° east (or west) of Greenwich, London.

57. First time in India which state announced cow cess?

A. Madhya Pradesh
B. Uttar Pradesh
C. Haryana
D. Rajasthan
E. Uttarakhand

Ans. D

Sol. First time in India Rajasthan announced cow cess. Rajasthan is the only state in India which has a dedicated Cow Ministry. Rajasthan government has imposed a 10% cow cess as surcharge on stamp duty for protection and propagation of cows in the state.

58. International boundary between India and Pakistan is demarcated by

A. McMahon Line
B. Durand Line
C. Radcliffe Line
D. Maginot Line

Ans. C

Sol. McMahon Line - India China
Durand Line - Pakistan Afghanistan
Radcliffe Line - India Pakistan
Maginot Line - France Germany

59. Who was the first Indian awarded the Oscar for lifetime achievements in Cinema?

A. Amitabh Bachchan
B. Satyajit Ray
C. Bhanu Athaiya
D. Shivaji Ganeshan

Ans. B

Sol.

- Satyajit Ray is one of the world's finest directors, producers, screenwriters, composers, writers, **Satyajit Ray was the first Indian awarded the Oscar for lifetime achievements in Cinema.**
- Oscars and graphic designers.
- are awards for artistic and technical merit in the film industry.

60. Where is Lomas rishi caves situated?

A. Barabar and Nagarjuni hills
B. Garo hills
C. Aravalli range
D. Baba budan hills
E. khasi hills

Ans. A

Sol. The Lomas Rishi Cave, also called the Grotto of Lomas Rishi, is a sacred architectural feature located in the Barabar and Nagarjuni hills of Jehanabad district in the Indian state of Bihar.

- This rock-cut cave was carved out as a sanctuary. It was built during the Ashokan period of the Maurya Empire in the 3rd century BC, as part of the sacred architecture of the Ajivikas.

61. NABARD was established on the recommendations of ___.

A. B. Sivaraman Committee
B. S. Wanchoo Committee
C. T. Rangarajan Committee
D. N. Tandon Committee
E. None of these

Ans. A

Sol. NABARD was established on the recommendations of **B. Sivaraman Committee**, (by Act 61, 1981 of Parliament) on 12 July 1982 to implement the National Bank for Agriculture and Rural Development Act 1981.

62. Who among the following Indian Prime Ministers was oldest to assume office?

A. Morarji Desai
B. Charan Singh
C. Indira Gandhi
D. Rajiv Gandhi

Ans. A

Sol. At the age of 81, Morarji Desai was the fifth Prime Minister of India from 1977-79.

63. Riboflavin is a/an

A. Hormone
B. Fatty acid
C. Enxyme
D. Vitamin

Ans. D

Sol. **Riboflavin** (vitamin B_2) is a water-soluble vitamin.

More Related to Riboflavin:

- It is required by the body for cellular respiration.
- Food sources include eggs, green vegetables, milk, and meat.
- Riboflavin was discovered in 1920, isolated in 1933, and first made in 1935.

64. Term 'Gambit' is associated with which of the following sports?

A. Basketball
B. Chess
C. Boxing
D. Golf
E. Tennis

Ans. B

Sol. Term 'Gambit' is associated with chess. It is derived from Italian word gambetto, meaning "to trip". It is s a chess opening in which the player of white, sacrifices a pawn, with the hope of achieving a resulting advantageous position.

65. The famous painting 'Monalisa' was the creation of:

A. Michael-Angelo
B.Leonardo-Da-Vinci
C. Piccasso
D. Van Gogh

Ans. B

Sol. The Mona Lisa is a half-length portrait of a woman by the Italian artist Leonardo da Vinci, which has been acclaimed as "the best known, the most visited, the most written about, the most sung about, the most parodied work of art in the world". Hence option B is the right answer.

66. The Keibul Lamjao, the only floating National Park in the world is in

A. Manipur
B. Mizoram
C. Assam
D. Meghalaya

Ans. A

Sol. The Keibul Lamjao National Park is a national park in the Bishnupur district of the state of Manipur in India. It is 40 km ² in area, the only floating park in the world, located in North East India, and an integral part of Loktak Lake.

67. ISRO has successfully launched GSAT-19 communication satellite through which of the following launching vehicle?

A. GSLV-Mk II
B. GSLV-Mk III
C. GSLV-Mk IV
D. GSLV-Mk V
E. None of these

Ans. B

Sol. India successfully launched its communication satellite GSAT-19 through GSLV-Mk III which is the heaviest rocket ever made by India.

Note: The satellite GSAT-19 has an intended lifespan of 10 years.It has an experimental payload called the geostationary radiation spectrometer(GRASP), to monitor and study the nature of charged particles in space and the influence of space radiation on satellites.

68. The largest country of the world by geographical area is _____.

A. Russia
B. Vatican City
C. Australia
D. USA

Ans. A

Sol. Russia is the largest country in the world (10.995% of the world landmass). Its Asian portion makes it the largest country in Asia, and its European portion makes it the largest country in Europe

69. When a ship enters the sea from a river what will be the effect?

A. It Lowers
B. It sways
C. It rises a little
D. It jolts

Ans. C

Sol. When a ship enters the sea from a river, it river, it rises a little since salt water is denser than river water. As the density of river water. As the density of river water is less than that of the sea water, the water displaced by the ship in the river is more than that displaced in the river is more than that displaced in the sea. So, it rises as it enters sea from river.

70. Which of the following is one of the sites from where Rockets are launched by ISRO, the Space Agency of India?

A. Sriharikota
B. Tarapore
C. Guwahati
D. Trombay
E. Jaitapur

Ans. A

Sol. Sriharikota is a barrier island off the Bay of Bengal coast located in the Indian state of Andhra Pradesh, India. It houses the Satish Dhawan Space Centre, one of the two satellite launch centers in India with the other being the Thumba Equatorial Rocket Launching Station in Thiruvananthapuram. Indian Space Research Organisation launch satellites using multistage rockets such as the Polar Satellite Launch Vehicle and the Geosynchronous Satellite Launch Vehicle from Sriharikota

71. Out of the first four numbers, the average of first three numbers is thrice the fourth number. If the average of the four numbers is 5 then the value of the fourth number is how much?

A. 4.5 B. 5

C. 2 D. 4

Ans. C

Sol. Let the fourth number be x.

Sum of four numbers = 5 × 4 = 20

Sum of first three numbers = 3x × 3 = 9x

Then, 9x + x = 20

⇒ x = 2

72. If a train 280 metres long runs at the speed of 7.4 m/ second, how much time will it take to cross a platform 460 metres long?

A. 95 sec B. 96 sec

C. 98 sec D. 99 sec

E. 100 sec

Ans. E

Sol. Total length to be coverd

$=(280+460=)740 \text{ metres}$

$\therefore$ Time taken $=\frac{740}{7.4}=100 \text{ seconds}$

73. A man can row $10\frac{4}{5}$ km/hr in still water and he finds that it takes him twice as much time to row up as to row down the same distance in river. The speed (km/hr) of the current is

A. 2 B. $2\frac{1}{2}$

C. $3\frac{3}{5}$ D. 5

E. None of these

Ans. C

Sol. Let speed of current = y

Acc. to question,

Total distance = D

$$=\frac{D}{\left(\frac{54}{5}-y\right)}=2\frac{D}{\left(\frac{54}{5}+y\right)}=\left(\frac{54}{5}+y\right)=2\left(\frac{54}{5}-y\right)$$

$$\Rightarrow y=3\frac{3}{5} km/hr$$

74. Find the numbers between 100 and 200, which are divisible by 3, 7 and 6 together?

A. 1 B. 2

C. 3 D. 4

E. 5

Ans. B

Sol. LCM of (3, 7 and 6) = 42

So, the number must be divisible by 42.

Therefore, there are only two numbers i.E. 126 and 168 which are divisible by 42.

Thus, only 2 numbers i.E. 126 and 168 are divisible by 3, 7 and 6.

So option (b) is the correct answer.

75. In a library, 20% of the books are in Hindi, 20% are in English and 18% are in the French. The remaining 29400 books are in regional language. What is the total number of books in the library?

A. 60000 B. 70000

C. 25000 D. 80000

E. None of these

Ans. B

Sol. Let total books = 100

Regional language book = 100 – (20 + 20 + 18) = 42

42 → 29400

$1 \longrightarrow \frac{29400}{42}$

$100 \longrightarrow \frac{29400}{42} \times 100 = 70000$

76. The cost of 26 kg of sugar is Rs 390. The cost of 17kg of rice is Rs 544 and the cost of 42 kg of wheat is Rs 672. What is the total cost of 24 kg of sugar, 36 kg of rice and 26 kg of wheat?

A. Rs 1850 B. Rs 1928

C. Rs 1880 D. Rs 1936

E. None of these

Ans. B

Sol. Cost of 26 kg of Sugar = 390

cost of 24 kg of sugar =390*24/26= 360

Cost of 17 kg rice = 544

cost of 36 kg of rice=544*36/17 = 1152

Cost of 42 kg of wheat = 672

cost of 26 kg of wheat=672*26/42 = 416

So total cost = (360+1152+416) = 1928

77. The compound interest on ₹ 30000 at 7% per annum for a certain time is ₹ 4347. The time is

A. 2 yr
B. 2.5 yr
C. 3 yr
D. 4 yr

Ans. A

Sol. Amount = 30000 + 4347 = 34347

Compound Interest = $P\times(1 + r/100)^n$

$34347 = 30000 \times (1 + 7/100)^n$

$34347/30000 = (107/100)^n = 11449/10000$

$(107/100)^n = (107/100)^2$

Hence n = 2

78. Three years ago, the ratio of the ages of A and B was 3:5 respectively. Three years hence the ratio of their ages will be 5:7 respectively. Find the present age of B.

A. 15 years
B. 21 years
C. 18 years
D. 12 years
E. None of these

Ans. C

Sol. Let the age of A and B 3 years ago be 3x and 5x respectively.

According to question,

$$\frac{3x+6}{5x+6}=\frac{5}{7}$$

21x + 42 = 25x + 30

4x = 12

x = 3

Therefore, present age of B = 5×3 + 3 = 18 years.

Hence, option C is correct.

79. A number is decreased by 20% and then again by 20%. By what percent should the new number be increased so as to get back the original number?

A. $56\frac{1}{4}\%$
B. $49\frac{2}{5}\%$
C. $47\frac{1}{3}\%$
D. $49\frac{1}{4}\%$
E. $57\frac{1}{4}\%$

Ans. A

Sol. Let the original number be a.

Given, number is decreased by 20% and then again by 20%.

Decreased number after 20% decrease = x - 20% of x = 0.8x

Decreased number after 2nd 20% decrease = 0.8x - 20% of 0.8x = 0.64x

% by which it should be increased to get the original number

$$= \frac{x - 0.64x}{0.64x} \times 100\%$$

$$= \frac{3600}{64}\% = \frac{225}{4}\%$$

$$= 56\frac{1}{4}\%$$

80. **Direction**: What will come in place of question mark in the following questions?

250, ?, 190, 167, 148, 131,

A. 207 B. 219

C. 216 D. 227

E. 232

Ans. B

Sol. 131+17=148

148+19=167

167+23=190

So 190+29=**219**

219+31= 250

so the difference of terms are prime numbers

81. Sum of three consecutive integers is 51 . The middle one is:

A. 14 B. 15

C. 16 D. 17

Ans. D

Sol. Sum of three consecutive integers is 51 .

Let consecutive numbers be a, a+1 and a + 2

Therefore,

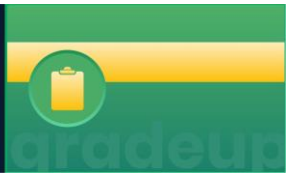
a + a + 1 + a + 2 = 51

⇒3a + 3 = 51

⇒a + 1 = 17

⇒a = 16

Middle number = a + 1 = 16 + 1 = 17



82. The area of a rectangular park is 180 cm^2 and the difference between the sides is 8 cm. Find the sum of the sides of the park.

A. 8 B. 56

C. 28 D. 18

Ans. B

Sol. Let the sides be a and b=a+8.

So, a*b = 180

a(a+8) = 180

and, a^2+8a-180 = 0

Solve the quadratic equation,

Hence, a= 10 cm and b= 18 cm

So, the sum of the sides of the park is 56 cm

Note:

Sum of the sides of rectangle is perimeter

83. Two numbers are in the ratio of 3:5. If 9 be subtracted from each, then they are in the ratio of 12:23. Find the numbers.

A. 15 : 28 B. 36 : 115

C. 33 : 55 D. 60 : 69

Ans. C

Sol. According to the question,

$\frac{3x-9}{5x-9}=\frac{12}{23}$ (Numbers = 3x and 5x)

$\Rightarrow 69x-207=60x-108$

$\Rightarrow 9x=207-108=99$

$\Rightarrow x=11$

∴Required numbers $\Rightarrow 3\times11$

$=33\ and\ 5\times11=55$

84. Out of the four numbers, second is twice of the first, third is twice of the second and last is sum of first, second and third numbers. If the average of these numbers is 280, find the largest number among the four.

A. 1200 B. 540

C. 560 D. 1120

E. None of these

Ans. C

Sol. Let the numbers are a, b, c and d.

Given:

b = 2a

c = 2b = 2(2a) = 4a

d = a + b + c

= a + 2a + 4a

= 7a

⇒14a/4 = 280

⇒a = 80

And d = 7a = 560

85. A person has three iron bars whose lengths are 10, 15 and 20 m respectively. He wants to cut pieces of same length from each of the three bars. What is the least number of total pieces if he is cut without any wastage?

A. 45 B. 15

C. 9 D. 30

Ans. C

Sol. Since the number of pieces required is least. Hence the length of each piece should be largest.

Hence the reqd. length of one piece.

= H.C.F. of 10, 15 and 20 m = 5 m

$\therefore$ Total number of pieces = $\frac{10}{5}+\frac{15}{5}+\frac{20}{5}$

= 2 + 3 + 4 = 9

86. 20 litres of a mixture contains 20% alcohol and the rest water. If 4 litres of water be mixed in it, the percentage of alcohol in the new mixture will be

A. $33\frac{1}{3}\%$ B. $16\frac{2}{3}\%$

C. 25% D. $12\frac{1}{2}\%$

E. None of these

Ans. B

Sol. In 20 liters of mixture, Alcohol $\Rightarrow \frac{20\times 20}{100}$ = 4 litres

Water $\Rightarrow$ 20-4= 16 liters on adding 4 liters of water, Quantity of water $\Rightarrow$ 16+4=20 liters

Quantity of mixture = 24 liters

$\therefore$ Required percent

$= \frac{4}{24}\times 100 = \frac{50}{3} = 16\frac{2}{3}\%$

87. Successive discounts of 20% and 10% are equivalent to a single discount of :

A. 28% B. 25%

C. 30% D. 15%

Ans. A

Sol. We have two successive discount be x% and y%, then equivalent discount

$$=\left(x+y-\frac{xy}{100}\right)\%$$

$$=\left(20+10-\frac{20\times 10}{100}\right)\%$$

$$=(30-2)\%$$

$$=28\%$$

88. **Direction:** What should come in place of question mark (?) in the following number series?

12, 7, 8, 13, ?, 68.5

A. 27 B. 19

C. 21 D. 24

E. 28

Ans. A

Sol. This series following this pattern,

×0.5+1, ×1+1, ×1.5+1, ×2+1, ×2.5+1

=13×2+1=**27**

7= 12×0.5+1

8= 7×1+1

13= 8×1.5+1

27=13×2+1------hence 27 is missing term

68.5= 27×2.5+1

89. A car goes one kilometer at 30 km per hour and then goes another kilometer at 40 km per hour. The average speed (in km/hour) of the car for 2 km is

A. 35 B. $34\frac{2}{7}$

C. $33\frac{3}{7}$ D. $33\frac{5}{7}$

Ans. B

Sol. Time taken by a car to cover 1 km at a speed of 30 km/hr = 1/30 hr

Time taken by a car to cover another 1 km at a speed of 40 km/hr = 1/40 hr

Now, total distance covered by the car = 1 + 1 = 2 km

$$\text{Total time} = \frac{1}{30} + \frac{1}{40} = \frac{7}{120}\text{hr}$$

Therefore, The average speed of the car =

$$\frac{\text{total distance}}{\text{total time}} = \frac{2}{\frac{7}{120}} = \frac{2\times120}{7} = \frac{240}{7} = 34\frac{2}{7}\text{km/hr}$$

Hence, option B is correct.

90. A tree increases annually by 1/8th of its height. By how much will it increase after 2 years, if it stands today 64 cm high?

A. 72 cm B. 74 cm

C. 75 cm D. 81 cm

Ans. D

Sol. In first year tree will increase by;

= 64 × 1/8 = 8 cm

Tree's Height at the end of I year = 64 + 8 = 72 cm

In second year tree will increase by;

= 72 × 1/8 = 9 cm

Tree's Height at the end of II year = 72 + 9 = 81 cm

Hence Option D is correct.

91. Ram and Shyam together can do a work in 8 days. Both of them began to work. After 3 days Ram fell ill. Shyam completed the remaining work in 15 days. In how many days can Ram complete the whole work?

A. 17 B. 12

C. 15 D. 13

Ans. B

Sol. Work of Ram and Shyam for

1 day = 1/8

∴ Work of Ram and Shyam for 3 days 3/8

∴ Remaining work = 1 – 3/8 = 5/8

∵ 5/ 8 work is done by Shyam in 15 days

∴ 1 work is done by Shyam

= 15 × 8/5 = 24 days.

∴ work of Shyam for 1 day = 1/24

∴ work of Ram for 1 day

= 1/8 – 1/24 = 1/ 12

Hence Ram alone will complete the work in 12 days.

92. The ages of Puja and Rani were in the ratio 3 : 2 a year ago. Five year hence, the ratio of their ages become 7 : 5. Find the present age of Rani

A. 37 B. 28

C. 25 D. 32

E. 27

Ans. C

Sol. Let the present ages of Puja and Rani be 'a' and 'b'.

Given, ages of Puja and Rani were in the ratio 3 : 2 a year ago.

$$\therefore \frac{a-1}{b-1} = \frac{3}{2}$$

⇒2a – 2 = 3b – 3

⇒a = 1.5b – 0.5

Also, five year hence, the ratio of their ages become 7 : 5.

$$\therefore \frac{a+5}{b+5} = \frac{7}{5}$$

⇒5a + 25 = 7b + 35

⇒7.5b – 2.5 + 25 = 7b + 35

⇒0.5b = 12.5

⇒b = 25

∴Present age of rani = 25 years

93. When a number is divided by 24, the remainder is 16. The remainder when the same number is divided by 12 is

A. 3 B. 4

C. 6 D. 8

Ans. B

Sol. the number is of form

N = 24Q + 16

on dividing by 12

N/12 = 2Q + (16/12)

=2Q + 1 + (4/12)

Thus the remainder is 4

OR

Required remainder = 16 – 12 = 4 because 24 is the multiple of 12

Hence Option B is correct.

94. **Direction:** What approximate value should come in place of the question mark (?) in the following equation (Note: You are not expected to calculate the exact value)?

$9980 \div 49 \times (4.9)^2 - 1130 = ?$

A. 3870 B. 4500

C. 2600 D. 3000

E. 4080

Ans. A

Sol. Approximate value be calculated as

$9980 \div 49 \times (4.9)^2 - 1130 = ?$

$?\approx 10000 \div 50 \times 25 - 1130$

$= 200 \times 25 - 1130 = 3870$

95. Two numbers, when divided by 17, leave remainders 13 and 11 respectively. If the sum of those two numbers is divided by 17, the remainder will be

A. 13 B. 11

C. 7 D. 4

Ans. C

Sol. Let the first Quotient be x

Therefore;

First number = 17x + 13

Let the second quotient be y

Therefore; Second number = 17y + 11

Sum of two numbers = 17x + 13 + 17y + 11 = 17(x+y)+24

On dividing the sum by 17 we get;

$$\frac{17(x+y)}{17} + \frac{24}{17}$$

Therefore; the remainder will be obtained by 24/17 only i.e., 7

Hence Option C is correct

96. Simplify:

$$\frac{2\times\left(2^7-2^5\right)}{2^3} + \frac{\left(2^3+2^5\right)}{2^2}$$

A. 34 B. $2^6 - 2$

C. $2^6 - 2^2$ D. 60

Ans. A

Sol. $$\frac{2\times\left(2^7-2^5\right)}{2^3} + \frac{\left(2^3+2^5\right)}{2^2}$$

$= 2*2^2(3) + 2(5)$

$= 24 + 10$

$=$ **34**

97. If monthly salary of A is 20% more than the salary of B. Salary of B is 30% more than salary of C. if their total salary per month is Rs. 34740, then the salary of C is

A. Rs. 5000 B. Rs. 9000

C. Rs. 2500 D. Rs. 3500

Ans. B

Sol. Let the monthly salary of C be 100x

then monthly salay of B=130x

Monthly salary of A= 120% of 130x=156x

Total salary of A, B and C= 34740

100x+130x+156x=34740

x=90

Hence salary of C=100*90= 9000

98. **Direction:** What will come in place of the question mark (?) in the following question?

(23 × 8) – (13 × 5) + 67 = ? x 6

A. 21 B. 31

C. 41 D. 33

E. None of these

Ans. B

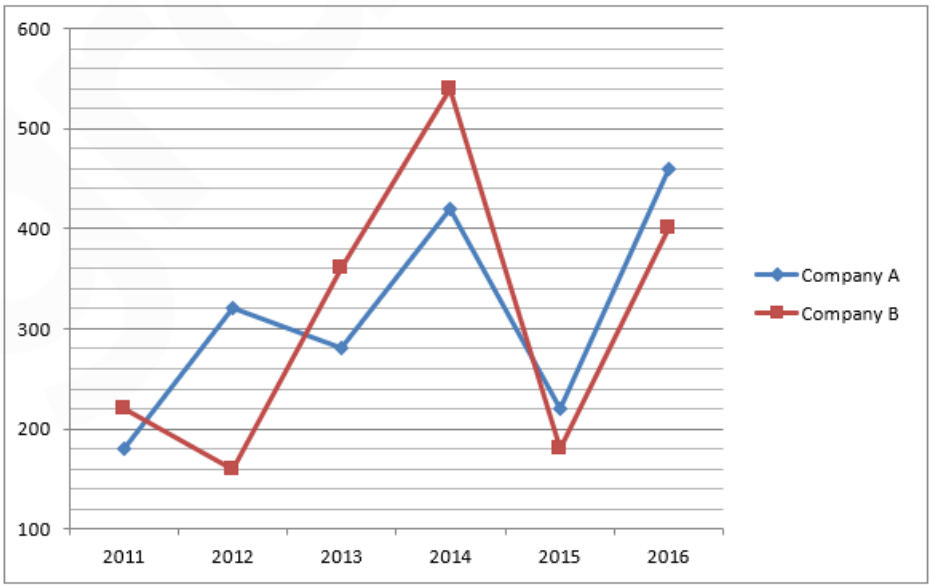
Sol. 184 – 65 + 67 = ? × 6

>186 = ? × 6

=>? = 186/6 = **31**

99. **Direction:** Refer the graph and answer the given questions.

The following line graph shows the number of products sold by company A and B during six years.



What is the difference between the total number of products sold by A and B together in 2013 to the total number of products sold in these two companies in 2016?

A. 240 B. 220

C. 180 D. 200

E. 270

Ans. B

Sol. Total products sold by A and B in 2013=280+360=640

Total products sold by A and B in 2016=460+400=860

Difference=860-640=220

Hence, option B.

100. The ratio of two numbers is 3 : 4 and their HCF is 4. Their LCM is

A. 12 B. 16

C. 24 D. 48

Ans. D

Sol. Let the numbers are 3x and 4x

then their HCF = x

But HCF = 4

$\therefore$ First number = 12

and Second number = 16

$\therefore$ LCM * HCF = 12*16

LCM * 4 = 12*16

LCM = 48

101. The synchronous speed for the seventh harmonics mmf were of 3-phase, 8 pole, 60 Hz induction machine is

A. 128.57 rpm in forward direction

B. 128.57 rpm in backward direction

C. 256.84 rpm in forward direction

D. 256.84 rpm in backward direction

Ans. A

Sol. $Ns = \frac{120f}{P} = \frac{120 \times 60}{8} = 900rpm$

The fifth harmonic poles rotate backward with sync speed Ns/s

The seventh harmonic poles rotate forward at $\frac{Ns}{7} = \frac{900}{7} = 128.57$

102. For a medium length transmission line, A is

A. equal to B B. equal to C

C. equal to D D. Not equal to any of the above

Ans. C

Sol. Medium transmission line (II or I network) is symmetrical.

Hence, A = D.

103. Match List-I (Conditions) with List-II (Damping constant) and select the correct answer using the code given below the lists:

List-I

A) Undamped

B) Underdamped

C) Critically damped

D) Overdamped

List-II

1) 0.5

2) 2.0

3) 0.0

4) 1.0

A. A-3; B-4; C-1; D-2

B. A-2; B-4; C-1; D-3

C. A-3; B-1; C-4; D-2

D. A-2; B-1; C-4; D-3

Ans. C

Sol. $\xi = 0 \Rightarrow$ damped

$\xi = 1 \Rightarrow$ critically damped

$\xi < 1 \Rightarrow$ underdamped

$\xi > 1 \Rightarrow$ overdamped

104. In a step-up chopper, an ideal switch is operated at 100 KHz with a duty ratio of 50%. Given that Δi_1 is 1.9 A and i_0 is 4 A. The peak current in switch will be:

A. 4.95 A

B. 8.95 A

C. 1.9 A

D. 4 A

Ans. B

Sol. peak current in switch:

$$I_{PR} = I_s + \frac{\Delta I_i}{2}$$

Where (I_s = average source current)

$$I_s = \frac{I_o}{1-\alpha} = \frac{4}{1-0.5} = 8A \Rightarrow I_{PR} = 8 + \frac{1.9}{2} = 8.95A$$

105. A balanced delta connected load has an impedance of $27\angle 60^\circ\ \Omega$ per phase. What is the impedance per phase of its equivalent star?

A. $9\angle 20^\circ$

B. $9\angle 60^\circ$

C. $81\angle 180^\circ$

D. $81\angle 60^\circ$

Ans. B

Sol. For qual impedance

$Z_D = 3Z_Y$

$$Z_y = \frac{Z_\Delta}{3} = \frac{27\angle 60^\circ}{3}$$

$Z_y = 9\angle 60^\circ\Omega$

106. Consider the following statements in connection with boundary relations of electric field:

1) In a single medium electric field is continuous.

2) The tangential components are the same on both sides of a boundary between two dielectrics.

3) The tangential electric field at the boundary of a dielectric and a current carrying conductor with finite conductivity is zero.

4) Normal component of the flux density is continuous across the charge-free boundry between two dielectrics.

Which of these statements is/are correct?

A. 1 only
B. 1, 2 and 3
C. 1, 2 and 4
D. 3 and 4 only

Ans. C

Sol. According to boundary condition for electric field

$E_{t1} = E_{t2}$

i.e., tangential component is continuous

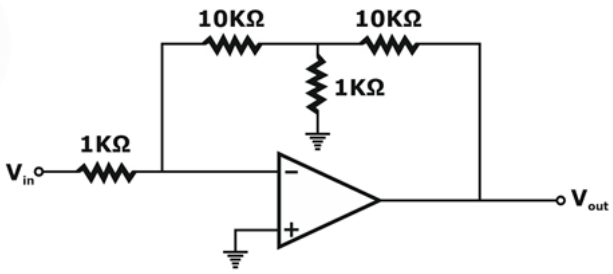
$D_{Y1} - D_{Y2} = -\rho_S$

if region is charge free $\rho_S = 0$

$D_{Y1} = D_{Y2}$

i.e, normal component of flux density is continuous across the charge free boundary. In case of perfect conductor $E_{t2} = 0$ since electric field does not exist inside a perfect conductor but in case of finite conductivity it can't be zero so statement 3 is wrong.

107. Assuming the operational amplifier to be ideal, the gain V_{out}/V_{in} for the circuit shown in figure is

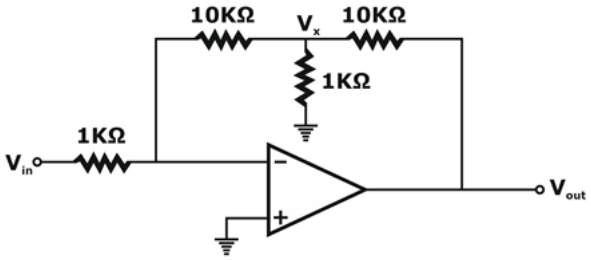


A. −120 B. −20

C. −100 D. −1

Ans. A

Sol.



$V^- = V^+ = 0$ (virtual ground)

KCL at negative terminal

$$\frac{0 - V_{in}}{1} + \frac{0 - V_x}{10} = 0 \quad ....(1)$$

At node x

$$\frac{V_x - 0}{10} + \frac{V_x - V_0}{10} + \frac{V_x - 0}{1} = 0$$

$$V_x = \frac{V_0}{12}$$

By putting in equation (1)

$$\frac{V_{in}}{1} + \frac{V_{out}}{120} = 0$$

$$V_{in} = -\frac{V_{out}}{120}$$

$$\frac{V_{out}}{V_{in}} = -120$$

108. The overall transfer function of a control system is given by

$$\frac{C(s)}{R(s)} = \frac{25}{s2 + 5\sqrt{2}s + 25}$$

The resonant peak is:

A. 1 B. 0.5

C. 0.75 D. 0.25

Ans. A

Sol. Characteristic equation is $s^2 + 5\sqrt{2}s + 25$

$$\omega_n = \sqrt{25} = 5$$

$$2\xi\omega_0 = 5\sqrt{2}$$

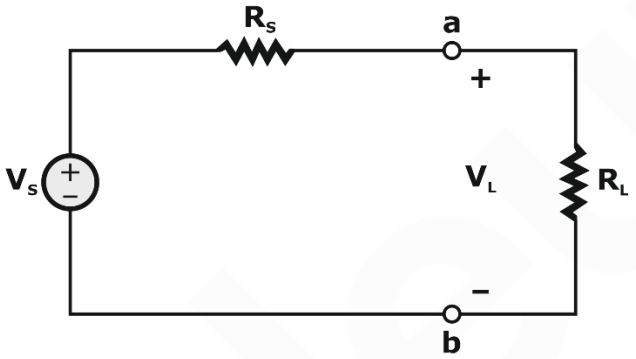
$$2 \times \xi \times 5 = 5\sqrt{2} \Rightarrow \xi = \frac{1}{\sqrt{2}}$$

Resonant peak:

$$Mr = \frac{1}{2\xi\sqrt{1-\xi^2}} = \frac{1}{2 \times \frac{1}{\sqrt{2}}\sqrt{1-\left(\frac{1}{\sqrt{2}}\right)^2}} = 1$$

$M_r = 1$

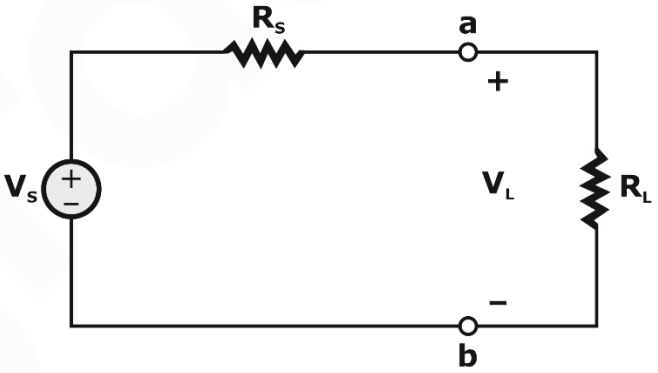
109. The terminal voltage of the voltage source is 6 V when connected to a 3 W load and 6.5 V when the load is disconnected. The source voltage V_s and its internal resistance R_s will be respectively



A. 6 V and 1 Ω
B. 6.5 V and 1 Ω
C. 6 V and 12 Ω
D. 0.5 V and 12 Ω

Ans. B

Sol. According to question



When the load is disconnected

$V_s = V_L = V_{OC} = 6.5$ V

When the load is connected

$V_L = 6V$ and $P_L = 3w$

$$P_L = \frac{V_L^2}{R_L} \Rightarrow R_L = \frac{V_L^2}{P_L} = 12\Omega$$

The load current becomes

$$I_L = \frac{V_L}{R_L} = \frac{6}{12} = \frac{1}{2}A$$

Now the voltage across R_S will be

$6.5 - 6 = 0.5V = R_s \times I_L$

$$R_S = \frac{0.5V}{I_L} = 1\Omega$$

110. When a 2300/230 V, 50 KVA, 50 Hz transformer is connected as an auto-transformer to supply a 2300 V circuit from a 2530 V source. The KVA rating of auto transformer will be:

A. 550 KVA
B. 500 KVA
C. 450 KVA
D. 50 KVA

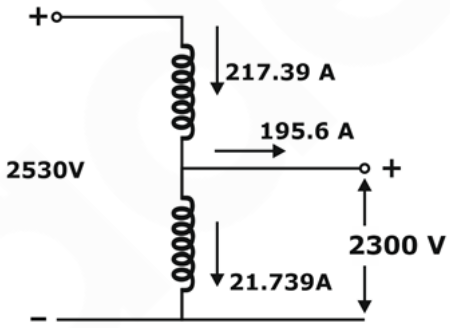
Ans. A

Sol. Current in LV winding:

$$I_{LV} = \frac{50,000}{230} = 217.39A$$

Current in HV winding:

$$I_{HV} = \frac{50,000}{2300} = 21.739A$$



Its KVA rating:

$= 2530 \times 217.39$

$= 550$ KVA

111. A step up chopper is supplied with a voltage of 200V. The load current is ripple free and the value is 20A. The chopper is commutable with commutating circuit with capacitor value of 100 μF. The commutation time of the circuit is:

A. 1 psec
B. 10 psec
C. 10 msec
D. 1 msec

Ans. D

Sol. Commutation time can lie express as;

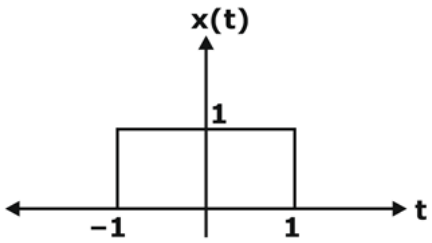
$$t_c = C.\frac{V_s}{I_o}$$

$$t_c = 100 \times 10^{-6} \times \frac{200}{20}$$

t_c = 1 msec

112. x(t) is a positive rectangular pulse from t = -1 to t = 1 with unit height as shown in figure. The value of

$$\int_{-\infty}^{\infty} |x(\omega)|^2 \, d\omega \{\text{where } X(\omega) \text{ is fourier transform of } x(t)\}$$



A. 2 B. 4

C. 2π D. 4π

Ans. D

Sol. By energy formula:

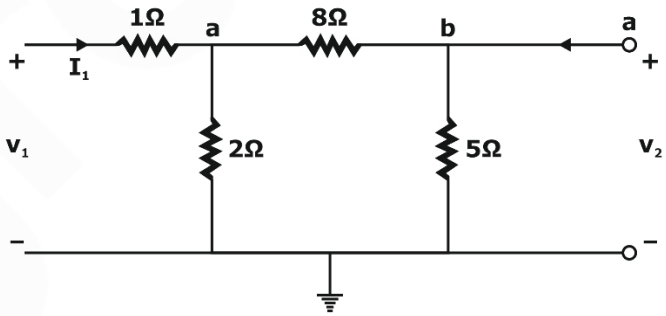
$$\int_{-\infty}^{\infty} |x(\omega)|^2 \, d\omega = 2\pi \int_{-\infty}^{\infty} |x(t)|^2 \, dt$$

$E_{x(\omega)} = 2\pi \times E_{x(t)}$

$E_{x(t)} = 1^2 \times (1 - (-1)) = 2$

$$\int_{-\infty}^{\infty} |x(\omega)|^2 \, d\omega = 2 \times 2\pi = 4\pi$$

113. The hybrid parameter h_{12} of the network shown in the figure below is



A. 2.5 B. 4

C. 0.25 D. 0.4

Ans. D

Sol. For h parameter model

$V_1 = h_{11} I_1 + h_{12} v_2$

$I_2 = h_{21} I_1 + h_{22} V_2$

$$h_{12} = \frac{V_1}{V_2} | I_{1=0}$$

Considering $I_1 = 0$, by writing the KCL equation at node 'a' we get,

$$\frac{V_1}{2} + \frac{V_1 - V_2}{3} = 0$$

$5v_1 = 2v_2 = 0$

$$\frac{V_1}{V_2} = \frac{2}{5} = 0.4$$

114. If a function f(t) is even, then its Fourier series will not contain:

A. Cosine terms
B. Sine terms
C. Dc term
D. None of the above

Ans. B

Sol. If the function f(t) is even, i.e., f(t) = f(-t), then its Fourier series is reduced to:

$$f_e(t) = a_0 + \sum_{n=1}^{\infty} a_n \cos n\omega t$$

Hence, the sine terms are absent from the Fourier series of an even function.

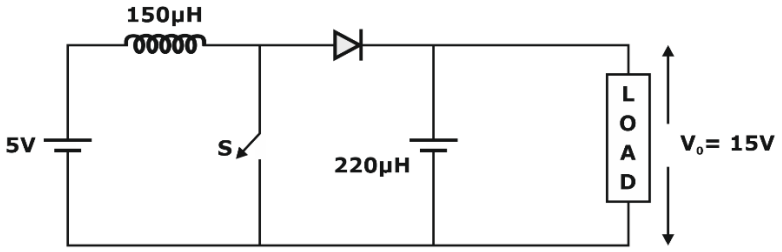
115. What is skin effect?

A. It is the phenomenon where the electric current flows away from the skin of the conductor
B. It is the phenomenon where the electric current flows mainly at the skin of the conductor
C. It is the phenomenon where the electric current flows outside the skin of the insulator
D. None of these

Ans. B

Sol. Skin effect is the tendency of an alternating electric current (AC) to become distributed within a conductor such that the current density is largest near the surface of the conductor, and decreases with greater depths in the conductor. The electric current flows mainly at the "skin" of the conductor, between the outer surface and a level called the skin depth. The skin effect causes the effective resistance of the conductor to increase at higher frequencies where the skin depth is smaller, thus reducing the effective cross-section of the conductor.

116. In the circuit shown below,



If the switching frequency of the regulator is 25 kHz, then the ripple current of the inductor ΔI is

A. 1.4 A
B. 2.2 A
C. 0.89 A
D. None

Ans. C

Sol. Here the given circuit is a boost regulator

$$v_o = \left(\frac{1}{1-\alpha}\right)v_s$$

$$15 = \left(\frac{1}{1-\alpha}\right)5$$

$$(1-\alpha) = \frac{5}{15}$$

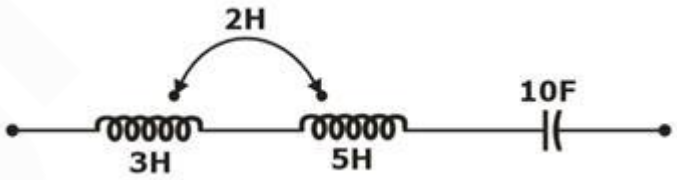
$$\alpha = 1 - \frac{5}{15} = 0.6667$$

The ripple current of inductor

$$\Delta I = \frac{V_s \alpha}{f_L} = \frac{5 \times 0.6667}{25 \times 10^3 \times 150 \times 10^{-6}}$$

ΔI = 0.89A

117. The resonant frequency of the series circuit shown in figure below:



A. 0.122 rad/sec
B. 0.138 rad/sec
C. 0.158 rad/sec
D. 0.252 rad/sec

Ans. C

Sol. $\omega_o = \frac{1}{\sqrt{L_{eq}C}}$

Leq = 3 + 5 – 4 = 4H

C = 10F

$$\omega_o = \frac{1}{\sqrt{4 \times 10}} = 0.158 \text{rad / sec}$$

118. Which one of the following is the correct statement?

Equipotential lines and field lines

A. are parallel

B. are anti-parallel

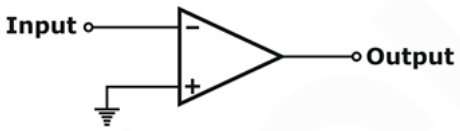
C. are orthogonal

D. bear no definite relationship

Ans. C

Sol. Equiotantial lines : Suppose scalar potential V is function of Z so for a particular Z, a plance parallel to xy plane will have equipotential lines, we know that $\vec{E} = -\nabla V$, gradient of scalar potential V will give a line $\perp$ to xy plane so equipotential lines and field lines are orthogonal to each other.

119. If the input to the circuit of figure is a sine wave. The output will be:



A. Half wave rectified sine wave.

B. Full wave rectified sine wave

C. Triangular wave

D. Square wave

Ans. D

Sol. In positive half cycle.

$V_{out} = -V_{sat}$

In negative half cycle

$V_{out} = V_{sat}$

Hence, output will be square wave.

120. The electric field strength at any point a distance 'r' from the point charge 'q' located in homogeneous isotropic medium with dielectric constant ϵ_γ is given by

A. $E = \frac{q \in^{-1}}{4\pi\gamma^2}\hat{\gamma}$

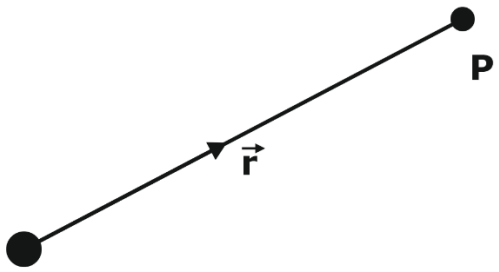
B. $E = \oint D \, da \cos\theta$

C. $E = \frac{q \in}{4\pi\gamma^2}\hat{\gamma}$

D. $E = \frac{q^2}{4\pi \in \gamma^2}\hat{\gamma}$

Ans. A

Sol.



Electric field strength at point P at a distance $\hat{\gamma}$ from charge q is given by

$$\vec{E} = \frac{1}{4\pi \in_0 \in_\gamma} \frac{q}{\gamma^3} \vec{\gamma} = \frac{q}{4\pi \in \gamma^2} . \hat{\gamma}$$

as $\hat{\gamma} = \frac{\hat{\gamma}}{|\vec{\gamma}|} = \frac{\hat{\gamma}}{\gamma}$

$$\therefore \vec{E} = \frac{q \in^{-1}}{4\pi\gamma^2} \hat{\gamma} \text{ (as } \in = \in_0 \in_\gamma)$$

121. In the system the line to ground capacitance is 0.11μF and inductance is 5 H. Determine the voltage appearing a cross pule of a C.B. if magnetizing current of $\sqrt{5}$ Amp is interrupted.

A. 50 KV
B. 60 KV
C. 70 KV
D. 20 KV

Ans. A

Sol. C = 0.01 μF = 10×10^{-8} F

L = 5H

Since $\frac{1}{2}CV^2 = \frac{1}{2}LI^2$

$$V = i\sqrt{\frac{L}{C}}$$

$$V = \sqrt{5} \times \sqrt{\frac{5}{1 \times 10^{-8}}}$$

$$V = \sqrt{5} \times \sqrt{5} \times 10^4$$

V = 50 KV

122. In a split phase single phase induction motor, the main winding should have

A. low resistance high inductance
B. high resistance low inductance
C. low resistance low inductance
D. high resistance high inductance

Ans. A

Sol. In a split phase motor, the main winding has low resistance and high inductance and auxilary winding has a high resistance and low inductance.

123. High frequency operation of a circuit is linked with

A. on-state loss in the device
B. off-state loss in the device
C. Switching loss in the device
D. all of above

Ans. C

Sol. High frequency operation of a circuit is linked with the switching loss in the device.

124. The Nyquist rate of signal x(t) = Sa(400 πt) + Sa(200πt) will be:

A. 800π Hz
B. 800 Hz
C. 400 Hz
D. 400π Hz

Ans. C

Sol. The Nyquist rate will be:

$\omega_{ny} = 2\omega_m$

when,

ω_m = maximum frequency in rad/sec.

$\omega_{ny} = 2 \times 400\pi = 800\pi$ rad/sec

$$f_{ny} = \frac{\omega_{ny}}{2\pi} = \frac{800\pi}{2\pi}$$

$f_{ny} = 400$ Hz

125. The total charge entering a terminal is given by q = 5t sin 4πt mc. The current at t = 0.5 sec.

A. 31.42 A
B. 68.84 A
C. 68.84 A
D. 31.42 mA

Ans. D

Sol. $i = \frac{dq}{dt} = \frac{d}{dt}(5t \sin 4\pi t)$

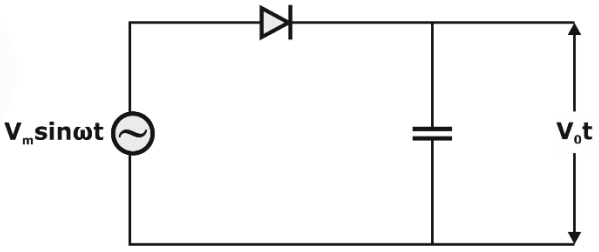
i = (5sin 4πt + 20πt cos 4πt) mA

at t = 0.5

i = 0 + 10π

i = 31.42 mA

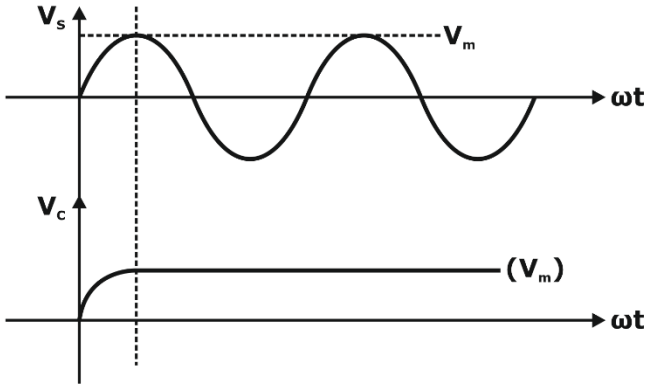
126. In the circuit shown below the average value of V_o (t) will be



A. V_m
B. $V_m/2$
C. 0
D. $-V_m$

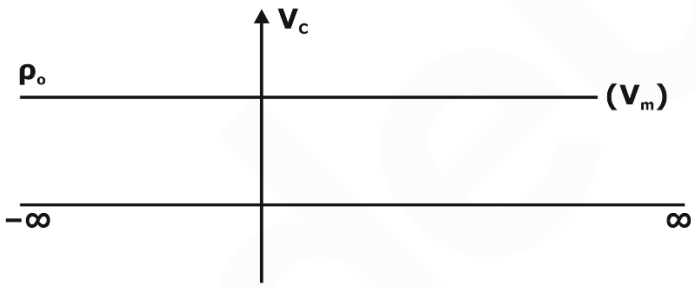
Ans. A

Sol.



So since we have considered the input voltage varies from 0 to ∞ so V_C will varies from 0 to ∞ at ωt axis.

While input voltage varies from −∞ to +∞ at 'ωt' axis so 'V_C' will varies from −∞ to +∞



So, $(V_C)_{avg} = (V_o(t)_{avg} = V_m)$

127. The surge impedance of 500 miles long line is 400Ω. For a 100 miles length it will be:

A. 400 Ω B. 800 Ω

C. 1600 Ω D. 200 Ω

Ans. A

Sol. Surge impedance, $Z_s = \sqrt{\frac{L}{C}}$

Independent from length of line,

128. The name plate of a 1 – Φ 4 – pole induction motor gives the following data: output 380 w; 230 volt; frequency 50 Hz; input current 3A; Power factor 0.7; speed 1475 rpm.

The motor η is

A. 58.76% B. 68.76%

C. 78.67% D. 88.76%

Ans. C

Sol. Name plate rating is always output rating so output power P_{out} = 380 W

Power input = VI cos α = 230 × 3 × 0.7

= 483 watt

$$So\%\eta = \frac{P_{out}}{P_{in}} \times 100 = \left(100 \times \frac{380}{483}\right) = 78.67\%$$

129. Given J is the current density at a given location in a resistive material, E is the electric field at that location, and σ is a material-dependent parameter called the conductivity, Ohm's law can be expressed as _____

A. J = σ/E
B. J = E/σ
C. J = σE
D. J = σE^2

Ans. C

Sol. The term Ohm's law is also used to refer to various generalizations of the law; for example the vector form of the law used in electromagnetics and material science

J = σE

Where J is the current density at a given location in a resistive material, E is the electric field at that location, and σ (sigma) is a material-dependent parameter called the conductivity.

130. Skin depth is the distance from the conducto surface where the field strength has fallen to

A. π of its strength at the surface
B. e of its strength at the surface
C. $\frac{1}{e}$ of its strength at the surface
D. $\frac{1}{\pi e}$ of its strength at the surface

Ans. C

Sol. The distance through which the wave amplitude decrease to a factor e^{-1} (or 1/e) is called skin depth.

131. The direction of rotation of field in a 3-φ induction motor depends upon

A. rotor resistance
B. magnitude of supply voltage
C. phase sequence of supply voltage
D. supply frequency

Ans. C

Sol. In a 3-φ induction motor the direction of rotation of field is depends upon the phase sequence of supply voltage.

By changing the phase sequence of supply voltage, we can reverse the direction of rotation of field in induction motor.

132. Point charges of −10 nC and 10 nC are located in free space at (−1, 0, 0) m and (1, 0, 0) m respectively. What is the energy stored in the field?

A. Zero
B. 450 nJ
C. −450 nJ
D. −900 nJ

Ans. C

Sol. Energy of the system $= \frac{q_1 q_2}{4\pi \in_0 \gamma}$

$= \frac{-10 \times 10^{-9} \times 10 \times 10^{-9}}{4 \times \pi \times 8.85 \times 10^{-12} \times 2}$

= – 449.5 nJ = – 450 nJ

133. Find the expression of output y[n] of the system, if an input is a unit step function as y[n] = (x[n] + x[n-1] + x[n-2]) /3.

A. $\frac{1}{3}(u[n]+u[n-1]+u[n-2])$

B. $\frac{1}{3}(u[n]-u[n-1]-u[n-2])$

C. $\frac{1}{3}(u[n]-u[n+1]-u[n+2])$

D. $\frac{1}{3}(-u[n]-u[n-1]-u[n-2])$

Ans. A

Sol. If the output of impulse response h[n] is y[n] of system when input x[n] is impulse function, so x[n] = δ[n] which shows that:

h[n] = (δ[n] + δ[n-1] + δ[n-2]) /3

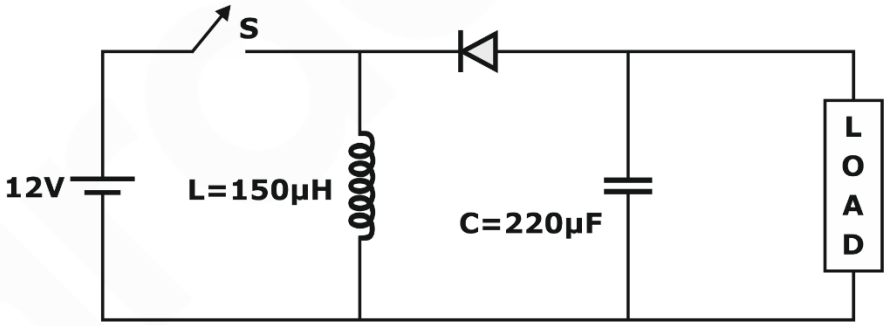
Let x[n] = u[n]

Now output y[n] of system will be:

$y[n] = \frac{1}{3}(x[n]+x[n-1]+x[n-2])$

$= \frac{1}{3}(u[n]-u[n-1]-u[n-2])$

134. In the circuit shown below



The average load current, duty cycle and switching frequency are 2.2 A, 0.25 and 25 kHz. The peak to peak output ripple voltage is

A. 100.08 mV

B. 50 mV

C. 100 mV

D. 87.76 mV

Ans. C

Sol. Given, I_o = 2.2 A

α = 0.25

$f = 25 \times 10^3$ Hz

The given circuit is back – boost regulator so, peak to peak output ripple voltage

$$\Delta v = \frac{\alpha I_o}{fC} = \frac{2.2 \times 0.25}{25 \times 10^3 \times 220 \times 10^{-6}}$$

$= 0.1V$

$\Delta V = 100$ mV

135. In a single phase VSI bridge inverter, the load current is $I_0 = 200 \sin(\omega t - 45°)$ mA. The d.c. supply voltage is 220 V. What is the power drawn from the supply?

A. 9.8 W

B. 19.8 W

C. 27.25 W

D. 34.03 W

Ans. B

Sol. $P_d = V_{01} \times I_{01} \cos\phi$

$$V_{01} = \frac{4V_s}{\pi \times \sqrt{2}} \text{ volt}$$

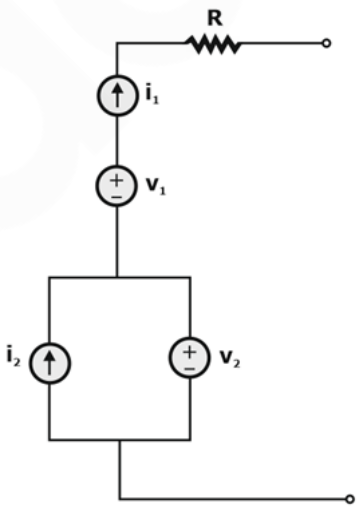
and

$$I_{01} = \frac{200}{\sqrt{2}} \text{ mA}$$

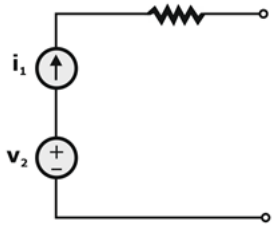
$$P_d = \frac{4 \times 200}{\pi \times \sqrt{2}} \times \frac{200}{\sqrt{2}} \cos 45° \times 10^{-3}$$

Pd = 19.8W

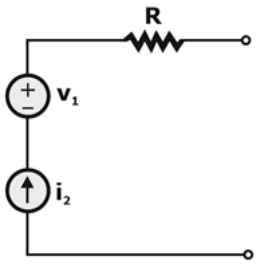
136. A simple equivalent circuit of the two-terminal network shown in the figure is:



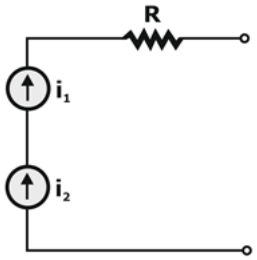
A.



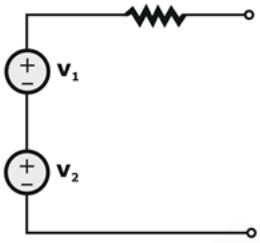
B.



C.



D.



Ans. A

Sol. The independent current voltage source in series can be replaced by current source.

The independent current and voltage source in parallel can be replaced by voltage source.

137. The ADC having highest conversion speed is

A. Dual slope ADC

B. Successive Approximation ADC

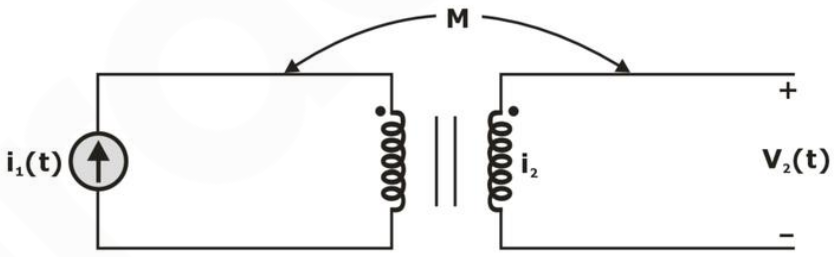
C. Flash ADC

D. Counter ADC

Ans. C

Sol. The Flash type ADC has the highest speed conversion and Dual scope ADC has the lowest conversion speed.

138. Consider the transformer circuit shown in the figure below:



The coupled coils have $L_1=L_2=$ 0.6 H and coupling coefficient of 0.25. If the current $i_1(t)=$ 6 sin(100t) A, then the voltage v_2 will be equal to

A. 0.9 cos(100t) V

B. 90 cos(100t) V

C. 0.9 sin(100t) V

D. 90 sin(100t) V

Ans. B

Sol. As output side is open.

Hence, $I_2 = 0$ A

$$V_2(t) = M\frac{di_1(t)}{dt}$$

$M = k\sqrt{L_1L_2} = 0.25\sqrt{0.6 \times 0.6} = 0.15H$

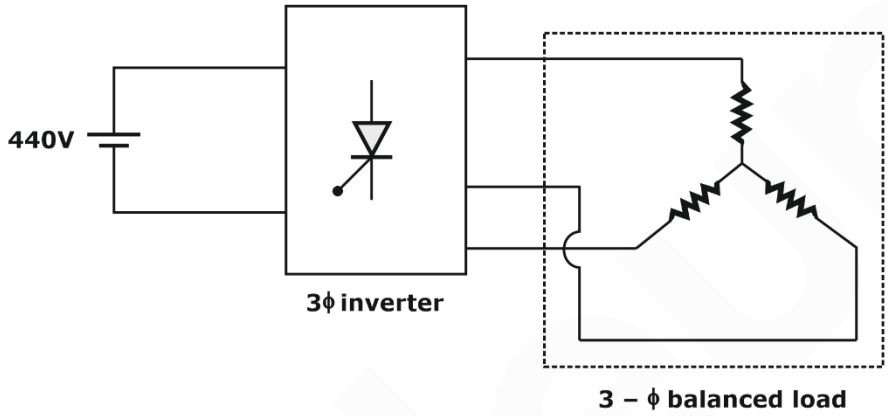
So,

$v_2(t) = M\frac{di_1(t)}{dt} = 0.15\frac{d}{dt}(6\sin 100t)v$

$V_2(t)$ = 0.15 × 6 × 100 cos (100 t) V

= 90 cos (100t) V

139. In a 3-ϕinverter circuit shown below, the load is balanced and the gating scheme is 180 degrees conduction mode. All the switching devices are ideal.



The RMS value of output line voltage is

A. 440 V

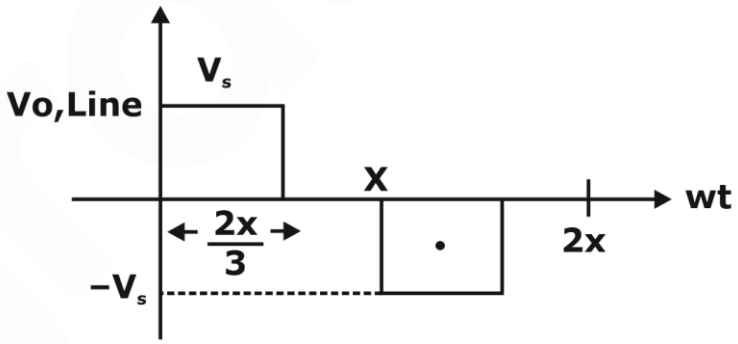
B. 230 V

C. 359.25 V

D. 267.89 V

Ans. C

Sol. The output waveform of line voltage is



$V_{o,rms}\ line = \sqrt{\frac{1}{\pi}\int_0^{2\pi/3} V_s^2\,\partial wt}$

$= vs\sqrt{\left(\frac{1}{\pi}\right)\left(\frac{2\pi}{3}\right)} = V_s\sqrt{\frac{2}{3}}$

$V_{arms}line = 440\sqrt{\frac{2}{3}} = 359.25V$

140. Power transformer are designed such that maximum efficiency occurs at

A. Half of the full load
B. Near full load
C. 0ne-fourth of the full load
D. Three-fourth of the full load

Ans. B

Sol. Normally power transformers runs on full load or switched off. So, it is desired to have maximum efficiency at full load.

141. Consider the magnetic field:

$B(t) = 4x^2\hat{a}_x + 8xy\hat{a}_y - 2Kxz\hat{a}_z$

The value of K will be :

A. 2
B. 4
C. 6
D. 8

Ans. D

Sol. Magnetic field is divergen-less.

$\bar{\nabla}.\bar{B} = 0$

$\frac{d}{dx}.\left(4x^2\right) + \frac{d}{dy}(8xy) - \frac{d}{dz}(2Kxz) = 0$

$8x + 8x - 2Kx = 0$

$16x + 2Kx$

$K = 8$

142. Given a unity feedback system with $G(s) = \frac{K}{s(s+8)}$, the value of K for damping ratio of 0.5 is

A. 16
B. 64
C. 8
D. 2

Ans. B

Sol. Close loop T.F

$= \frac{K}{s^2 + 8s + K}$

Comparing with $s^2 + 2\Sigma\omega_n s + \omega^2_n$

$\omega^2_n = K$

$\omega_n = \sqrt{k}$

$2\Sigma\omega_n = 8$

$2 \times 0.5 \times \omega_n = 8$

$2 \times 0.5 \times \sqrt{k} = 8$

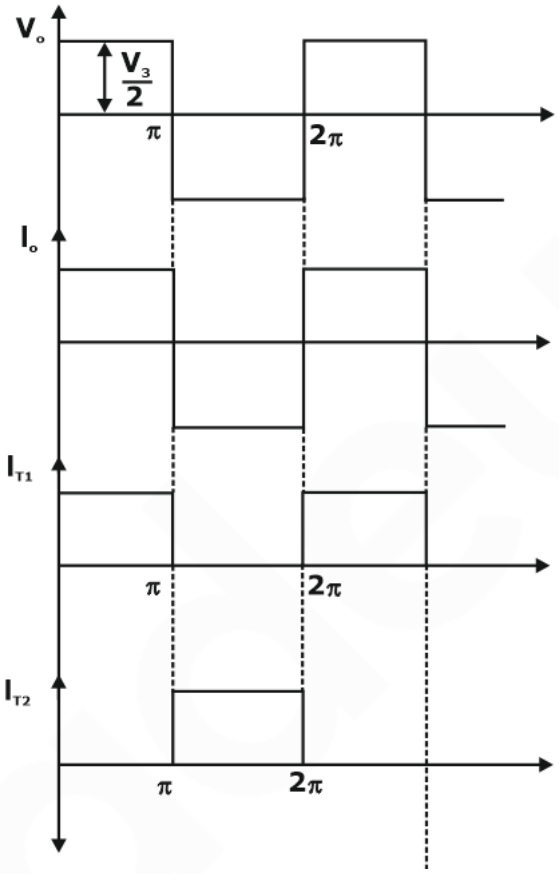
$K = 64$

143. A single phase half bridge inverter supplied from 230 V dc, feeds a resistive loud of 5Ω. The average and peak value of current through each thyristor respectively arc

A. 48A, 23A
B. 25A, 11.5A
C. 11.5A, 23A
D. 23A, 46A

Ans. C

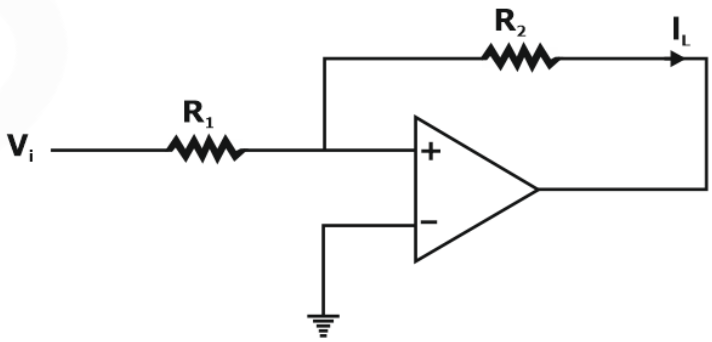
Sol.



$$I_T(avg) = \frac{V_s}{2R} \times \left(\frac{\pi}{2\pi}\right) = \frac{V_s}{4R} = 11.5A$$

$$I_T(peak) = \frac{V_s}{2R} = \frac{230}{2 \times 5} = 23A$$

144. Consider the circuit shown in figure below:

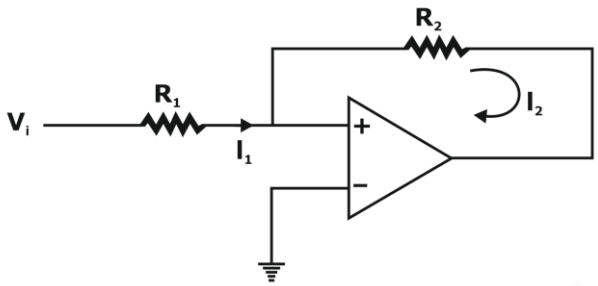


If the op amp is ideal, then the circuit can be used as

A. Current controlled current source
B. Voltage controlled voltage source
C. Current controlled voltage source
D. Voltage controlled current source

Ans. D

Sol.



In the circuit v_i is the input voltage and Io is the output current

Now, Vi Indus a current I1 in the circuit and

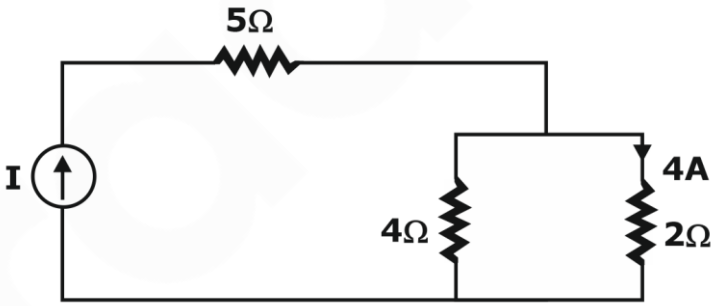
$$I_1 = \frac{V_1}{R_1} = I_o$$

Thus $I_0 \propto v_i$

Thus I_o

Hence, it is a voltage controlled current source

145. Consider the circuit shown below:



The total power supplied by the current source is

A. 152 W
B. 228 W
C. 352 W
D. 456 W

Ans. B

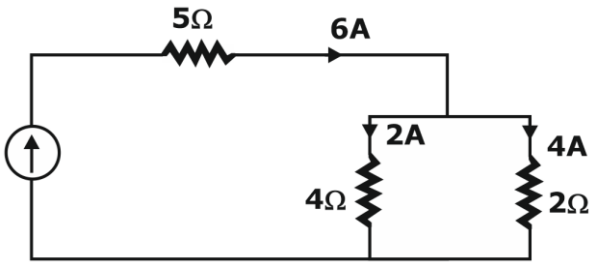
Sol. By current division rule:

$$4 = \frac{4}{4+2} \times I$$

I = 6 A

By KCL at node:

Current in 4 ohm resistor = 6 - 4 = 2 A



$P = (6)^2 \times 5 + (4)^2 \times 2 + (2)^2 \times 4 = 228$ Watt

146. Determine the bandwidth of a feedback amplifier. Consider a feedback amplifier with an open-loop low frequency gain of $A = 10^4$, an open-loop bandwidth of $\omega_H = 2\pi(100)$ rad/sec and a closed loop gain of 50 .

A. 314 Hz
B. 125.7 KHz
C. 125.7 Hz
D. 314 KHz

Ans. B

Sol. Closed loop gain is:

$$A_j(0) = \frac{A_0}{1+\beta A_0} = \frac{10^4}{1+\beta A_0}$$

$$50 = \frac{10^4}{1+\beta A_0}$$

$(1 + \beta A_0) = 200$

Bandwidth of closed loop:

$\omega_{fH} = \omega_H(1 + \beta A_0) = 2\pi\ (100)\ (200)$

$\omega_{fH} = 125.7$ KHz

147. Which of the following method is not used to measure the high resistance?

A. Direct deflection method
B. Meg ohm bridge method
C. Loss of charge method
D. substitution method

Ans. D

Sol. The different method which are used to measure high resistance-

(i) Direct deflection method

(ii) Megohm bridge method

(iii) loss of charge method

(iv) Meggar.

Substitution method is usd to measure the medium resistances.

148. In the Sumpner's test, secondary of both transformer are connected in _____ and secondary side wattmeter reading gives _____ ?

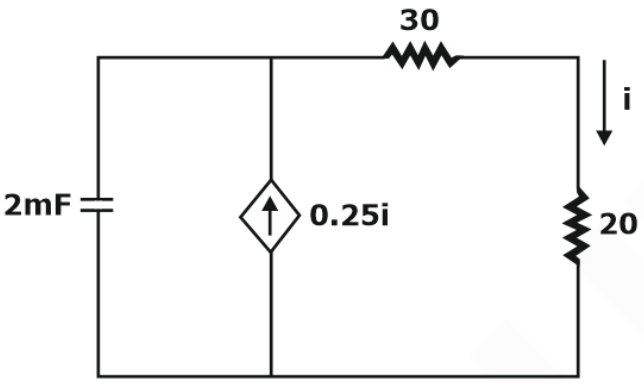
A. parallel, full load copper loss of both transformer
B. series, No-load iron loss of both transformer
C. parallel, No-load iron loss of both transformer
D. series, full load copper loss of both transformer

Ans. D

Sol. In the sumpner's test :

Both the transformer's primary are connected in parallel and wattmeter connected in primary side gives the reading of iron loss of both the transformer and both the transformer's secondary are connected in series and wattmeter connected in secondary side gives reading of full load copper loss of both transformer.

149.



Find the time constant of the circuit ?

A. 0.322 sec

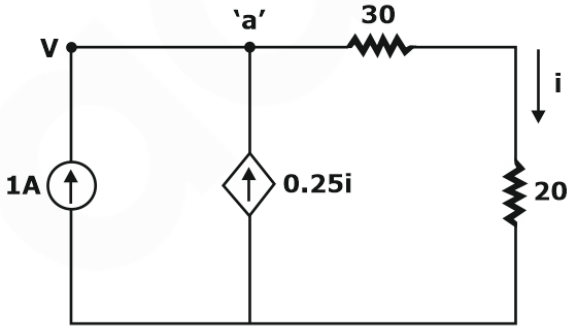
B. 0.133 sec

C. 1.21 sec

D. 0.43 sec

Ans. B

Sol. To calculate R_{eq}, Connect a 1 A current source in place of capacitor.



Apply KCL at node 'a'

1 + 0.25i = i

1 = 0.75i

i = 1.333 A

Apply KVL

V = 30i + 20i

V = 50i

V = 66.65 V

$$Rth = \frac{V}{T} = \frac{66.65}{1} = 66.65\Omega$$

Time constant $\tau = ReqC$

$\tau = 66.65 \times 2 \times 10^{-3} = 0.133$ sec

150. A logic circuit implements the boolean functions $f = \overline{X}.Y + X.\overline{Y}\overline{Z}$. If is found that input combination X = Y = 1 can never occur. taking this into account, a simplified expression for f is given by

A. $\overline{X} + \overline{Y}.\overline{Z}$ B. $X + Z_1$

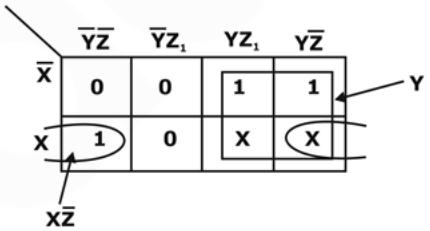
C. $X + \overline{Z}$ D. $Y + X.\overline{Z}$

Ans. D

Sol. Truth table:

X	Y	Z	F
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	1
1	1	0	X
1	1	1	X

K-map:



$f = Y + X\overline{Z}$

151. for a single line to ground fault the zero-sequence current is given by j 4.0 pu. The current carried by neutral during the fault is

A. j 4.0/3 pu B. j 4.0 pu

C. j 1.2 pu D. j 8.0 pu

Ans. C

Sol. For single line to ground fault:

$If_{LG} = 3 \times I_{a0} = 3 \times j\ 4.0$

$If_{LG} = j\ 1.2$ pu

152. For any fixed degree of induction short compensation, additional scries capacity compensates

A. Will increase effective compensation.

B. increase spiritual surge impedance loading of line.

C. increase virtual surge impedance of line.

D. decrease virtual surge impedance loading of line.

Ans. B

Sol. By adding capacitive compensation, effective scries impedance decreases.

Hence, $SI = \sqrt{\frac{L}{C}} = Z_s$

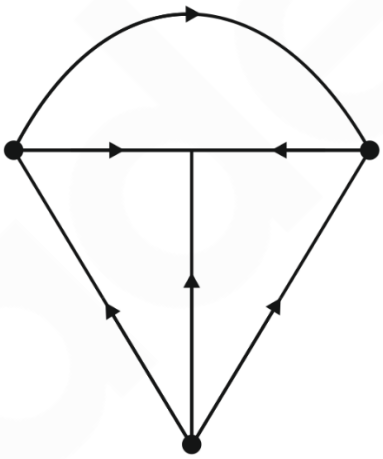
Hence, surge impedance will decrease.

$$SIL = \frac{V^2}{\sqrt{L/C}}$$

SIL will increase

Hence, option B is correct.

153. The maximum number of trees of the graph shown in the figure is.



A. 8 B. 14

C. 12 D. 16

Ans. D

Sol. Given graph is a complete graph

The maximum number of possible trees = n^{n-2}

Where n = total number of nodes

n = 4

Total number of trees = $4^{(4-2)} = 4^2 = 16$

154. Find $\overline{A} \oplus B$.

A. A⊙ B B. A⊕ B

C. A + B D. A . B

Ans. A

Sol. $\overline{A} \oplus B = \overline{A}\overline{B} + \overline{\overline{A}\overline{B}} = \overline{A}\overline{B} + AB$

$\overline{A} \oplus B = A \odot B$

155. A 4 ½ digital voltmeter is working of 10 V scale. A voltage of 0.4268 will be displayed as

A. 0.4268 B. 0.426

C. 0.4300 D. 0.7000

Ans. B

Sol. Resolution on 10V scale = $\frac{10}{10^n}$

Where n is number of full bits

$\text{Resolution} = \frac{10}{10^4} = \frac{1}{1000} = 0.001$

Reading displayed = 0.426 V

156. What is the attenuation constant α for distortionless transmission line ?

A. α = 0 B. $\alpha = R\sqrt{\frac{C}{L}}$

C. $\alpha = R\sqrt{\frac{L}{C}}$ D. $\alpha = \sqrt{\frac{RL}{C}}$

Ans. B

Sol. For distortion less transmission line

RC=LG

and $\alpha = R\sqrt{\frac{C}{L}} = R\sqrt{\frac{G}{R}} = \sqrt{RG}$

157. A 1 – φ transformer has p.u. leakage impedance is (0.03 + j0.06). The rating of transformer is 10 kVA, 400V/200V supply the current of 50 Amp a resistive load find the value of load voltage

A. 194 B. 390

C. 192 D. 197

Ans. A

Sol. Since load is resistive cosφ = 1 $\Rightarrow \boxed{\phi = 0°}$

$\frac{\Delta V}{V}$ = voltage regulation = $R_{p.u.}\cos\varphi + X_{p.u.}\sin\varphi$

= 0.03 × 1 + 0.06 × 0 = 0.03

Secondary side voltage = 200 Volt

Voltage drop ΔV = V × 0.03

= 200 × 0.03 = 6 volt

So voltage on secondary side = 200 – 6 = 194 volt

158. A current of (0.5 + 0.6sin 3ω – 0.8 sin 5ωt) A is passed through the moving coil (permanent magnet) what it read

A. 0.866 Amp
B. 0.5 Amp
C. 0.6 Amp
D. 0.9 Amp

Ans. B

Sol. Since moving coil (permanent magnet) measure average value or dc value only. When sinusoidal signal is send to it, it shows zero defection

So

Dc value

159. A dual slope integrating type A/D converter has 2 μF capacitor and 100 kΩ resistor connected to it. If the reference voltage is taken as 7 V and output voltage cannot exceed 15 V, the time for which reference voltage will be integrated will be

A. 212 msec
B. 352 msec
C. 150 msec
D. 429 msec

Ans. D

Sol. Output voltage of dual slope A/D converter

$$V_o = \frac{1}{RC}\int_0^t V_{ref}dt$$

$$= \frac{1}{100\times10^3\times2\times10^{-6}}\int_0^t 7dt = 5\int_0^t 7dt = 35t$$

And output voltage, Vo = 15V, 35t = 15

$$t = \frac{15}{35} = 0.429\,\text{sec} = 429\text{m}\,\text{sec}$$

160. The disc of an energy meter makes 600 revolutions per unit of energy. When a 1 KW load is connected the disc rotates at 10.2 rpm. If the load is on for 12 hours how many units are recorded as error?

A. 0.75 kWh
B. 0.100 kWh
C. 0.24 kWh
D. 100 kWh

Ans. C

Sol. Energy actually consumed = 1 kW × 12 h = 12 kWh

Total no. of revolution made by the disc during the period of 12 hours.

= 10.2 × 60 × 12 = 7344 rev.

Since 600 revolution in 1 kWh, therefore energy recorded by the meter

$$= \frac{7344}{600} = 12.24\text{kWh}$$

Hence extra unit recorded as error = 12.24 – 12 = 0.24 kWh

161. The power of a 9. Phase 9-wire circuit can be measured with minimum of

A. One wattmeter
B. Two wattmeter
C. 9 wattmeter
D. eight wattmeter

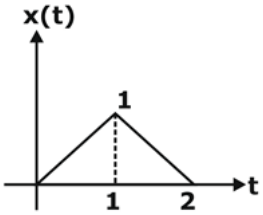
Ans. D

Sol. Minimum number of wattmeter required to measure power = n – 1

Where, n = Number of wires in the circuit = 9

So, we require minimum 8 wattmeter.

162. The Laplace transform representation of the triangular pulse shown below is:



A. $\frac{1}{s^e}[1+e^{-2s}]$
B. $\frac{1}{s^e}[1+e^{-s}+e^{-2s}]$
C. $\frac{1}{s^e}[1+e^{-s}+2e^{-2s}]$
D. $\frac{1}{s^e}[1+2e^{-s}+e^{-2s}]$

Ans. D

Sol. In terms of ramp signal

$x(t) = r(t) - 2r(t-1) + r(t-2)$

Taking Laplace transform

$$X(s) = \frac{1}{s^2} - \frac{2}{s^2}e^{-s} + \frac{1}{s^2}e^{-2s}$$

$$X(s) = \frac{1}{s^2}\left[1 - 2e^{-s} + e^{-2s}\right]$$

163. The system is originally critically damped. If the gain is doubled then it will become:

A. Remains same
B. Over damped
C. Under damped
D. Undamped

Ans. C

Sol. $\xi \propto \frac{1}{\sqrt{K}}$

$$\frac{\xi_1}{\xi_2} = \sqrt{\frac{K_2}{K_1}}$$

$$\frac{1}{\xi_2} = \sqrt{\frac{2}{1}}$$

$$\xi_2 = \frac{1}{\sqrt{2}}$$

$\therefore 0 < \xi < 1$ is underdamped.

164. The transfer function of a system is given as $G(s) = \frac{100}{s^2 + Ks + 100}$, settling time is 4 sec (Assuming 2% tolerance band)

The frequency of damped oscillation is:

A. 10 rad/sec
B. 9.95 rad/sec
C. 9.95 Hz
D. 10 Hz

Ans. C

Sol. $T.F. = \frac{100}{s^2 + Ks + 100}$

Comparing characteristic equation with $s^2 + 2s\xi\omega_n + \omega_n^2$

$\omega_n^2 = 100;\ \omega_n = 10$ rad/sec.

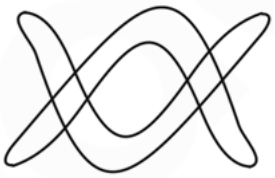
$T_S = \frac{4}{\xi\omega_n} = 4$

$\xi\omega_n = 1 \Rightarrow \xi = 0.1$

$\omega_d = \omega_n\sqrt{1-\xi^2} = 10\sqrt{1-0.1^2}$

$\omega_d = 9.95$ rad/sec

165. When two signals are applied on two axis of CRO. The Lissajous pattern visible is shown below. If the frequency of signal on y-axis is 1 KHz. frequency of signal on x-axis is :

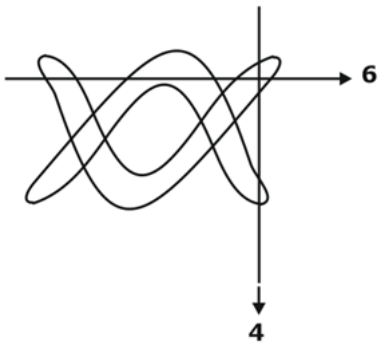


A. 0.67 KHz
B. 0.33 KHz
C. 1 KHz
D. 2 KHz

Ans. A

Sol. Ratio of frequencies can be expressed as.

$\frac{f_y}{f_x} = \frac{\text{No. of horizontal tangencies}}{\text{No. of vertical tangencies}}$



$$\frac{1\times10^3}{f_x}=\frac{6}{4}$$

$$f_x=\frac{2}{3}KHz$$

f_x = 0.67 Hz.

166. A 10 KVA, 400 V/200V, single phase transformer with 10 % impedance, draws a steady short circuit current of

A. 50 A B. 150 A

C. 250 A D. 400 A

Ans. C

Sol. p.u. short circuit current $I_{S.C.(p.u.)}=\frac{1}{X_{p.u.}}=\frac{1}{0.1}=10p.u.$

Rated base current = $\frac{10000}{400}=25A$

∴ Steady short circuit current = 25 × 10 = 250 A

167. Two mechanically coupled alternators deliver power at 50 Hz and 60 Hz respectively. The highest speed (in rpm) of the alternators is

A. 3600 B. 3000

C. 600 D. 500

Ans. C

Sol. Since the machine are mechanically coupled so their speed will be same.

Let machine – 1 has no. of pole = P_1

Machine-2 has no. of pole = P_2

$$So, N=\frac{120f}{P}$$

$N_1 = N_2$

$$\frac{120\times50}{P_1}=\frac{120\times60}{P_2}$$

$$\frac{P_2}{P_1}=\frac{6}{5}$$

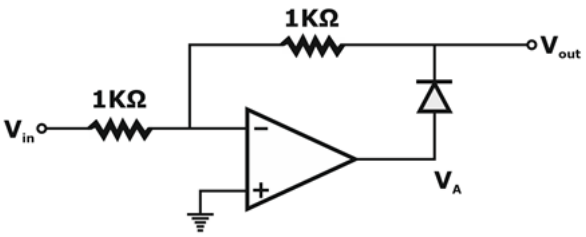
$$\frac{P_2}{P_1}=\frac{6\times2}{5\times2}=\frac{12}{10}$$

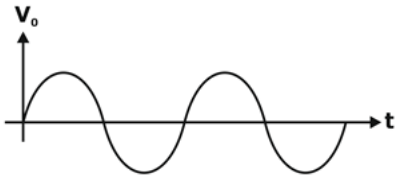
As pole cannot be add

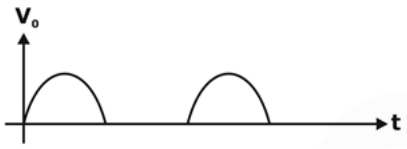
So $\boxed{P_2=12}$ $\boxed{P_1=10}$

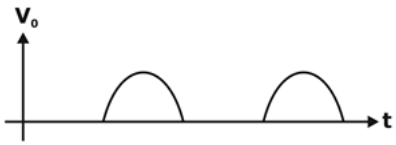
$$So\ Speed=\frac{120\times50}{10}=600rpm$$

168.



A. 

B. 

C. 

D. None of the above

Ans. C

Sol. The positive half cycle:

$V_{in}\rightarrow$ +ve $\rightarrow V_A\rightarrow$ −ve

Hence, diode D is reverse biased (open)

$V_0 = 0$

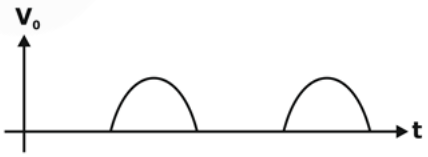
For negative half cycle.

$V_{in}\rightarrow$ −ve $\rightarrow V_A\rightarrow$ +ve

Hence, diode 0 is forward biased (short)

$$V_0 = -\frac{R_1}{R_i}V_{in} = \frac{-1}{1}V_{in} = -V_{in}$$

Waveform will be:



169. In a double squirrel cage induction motor the outer cage winding has _____

A. low resistance and low reactance

B. high resistance and high reactance

C. low resistance and high reactance

D. high resistance and low reactance

Ans. D

Sol. In a double squirrel cage induction motor the outer cage offer high resistance and low reactance as compare to inner cage winding. Due to high resistance of outer cage is provides high starting torque.

170. Two meters X and Y requires 40 mA and 50 mA respectively to give full scale deflection then

A. Sensitivity can't be judged
B. Both are equally sensitive
C. X is more sensitive
D. Y is more sensitive

Ans. C

Sol. $\text{sensitivity} \propto \frac{1}{I_m}$

Where, I_m is the current

$\therefore$ X is more sensitive then Y

171. A 3 phase inverter with dc supply of 200 V is operating in 120 degrees conduction mode. The rms value of fundamental component of output line to line voltage is

A. 200 V
B. 135.04 V
C. 110.08 V
D. 92.56 V

Ans. B

Sol. In 120 ° conduction of 3 – φ VSI, Fourier analysis of output line voltage is

$$vab = \sum_{n=6k\pm1}^{\infty} \frac{3v_s}{n\pi} \sin n\left(\omega t + \frac{\pi}{3}\right)$$

Where k = 1, 2, 3

$$V_1(\bar{L} - L) = \frac{3v_s}{\pi} \sin\left(\omega t + \frac{\pi}{3}\right)$$

$$V_{1rms} = \frac{3v_s}{\sqrt{2}\pi} = \frac{3 \times 200}{\sqrt{2}\pi} = 135.04V$$

172. A step up chopper is supplied by voltage of 300 V. with on time period of 200 msec. The commutation time of the circuit is 20 msec. The switching frequency is 4.167 Hz.

The average output voltage is:

A. 25 V
B. 30 V
C. 20 V
D. 35 V

Ans. B

Sol. For step up chopper

$$V_{oavg} = \left(\frac{T_{ON} + 2t_{cm}}{T}\right) V_s$$

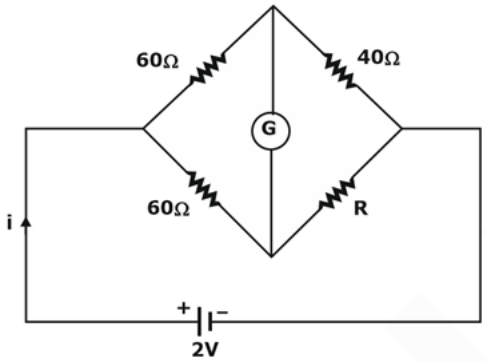
$$\text{where } T = \frac{1}{f} = \frac{1}{4.167} = 240m\,\text{sec}$$

$$v_{o\,arg} = \left(\frac{20 + 2 \times 2}{240}\right) \times 300$$

$$= \frac{24}{240} \times 300$$

V_{oavg} = 30 V

173. In the circuit shown below when the current through galvanometer is zero, the battery current will be:



A. 2mA
B. 10mA
C. 40mA
D. 20mA

Ans. C

Sol. the current in galvanometer is zero

The circuit will be in balanced condition

60 × R = 40 × 60

R = 40 Ω

Equivalent resistance = (60 + 40) || (60 + 40)

= 100 ||100

= 50 Ω

$$i = \frac{2}{50} = 40mA$$

174. The MOD of the N bit Ring counter is

A. 2N
B. N
C. N/2
D. N/4

Ans. B

Sol. The Modulus of the N-bit Ring counter is N.

175. A synchronous machine has full pitch coil having coil span of 15 slots. For eliminating 3rd harmonics the coil span should be-

A. 5 slots
B. 10 slots
C. 12 slots
D. 8 slots

Ans. B

Sol. Let assume one slot has slot pitch = r

For a full pitch coil span = ɳ

15r = ɳ

$r = \frac{\pi}{15}$

To eliminate the third harmonics,

$\cos\left(\frac{3\alpha}{2}\right) = 0$

$\frac{3\alpha}{2} = \frac{\pi}{2}$

$\alpha = \frac{\pi}{3}$

Now, the coil span must be

ɳ – ɑ

$= \pi - \frac{\pi}{3} = \frac{2\pi}{3}$

$n \times r = \frac{2\pi}{3}$

$n \times \frac{\pi}{15} = \frac{2\pi}{3}$

n = 10slots

176. A power system network with a total load of 2000 MW is operating at 50 Hz. The load is varying 3% to every 1.5 % change in frequency. If suddenly 250 MW load is tripped, then the steady state frequency deviation is (Assume speed regulation parameter as 0.002Hz/MW)

A. 1 Hz
B. 0.96 Hz
C. 0.56 Hz
D. 0.43 Hz

Ans. D

Sol. Steady state frequency deviation

$\Delta f = \frac{\Delta P_\alpha}{B + \frac{1}{R}} = \frac{250}{B + \frac{1}{R}}$

$B = \left(\frac{\frac{3}{100} \times 2000}{\frac{1.5}{100} \times 50}\right) = \frac{60}{0.75} = 80$

$\Delta f = \frac{250}{80 + \frac{1}{0.002}} = 0.43\text{Hz}$

177. Series reactors are used to

A. improve the transmission efficiency

B. improve the power factor of the power system

C. improve the voltage regulation

D. bring down the fault level within the capacity of switchgear.

Ans. D

Sol. A series or current limiting reactor is an induction coil having a large inductive reactance in comparison to its resistance and is used for limiting short circuit current during fault.

178. Which of the following is wrong about dual-slope integration type Analog-to-digital converter

1) Higher speed compared to all other type of A/D converter

2) Very good accuracy without putting extreme requirement on component stability

3) Good rejection of power supply hum.

A. Only 1 B. 1 and 2

C. 2 and 3 D. 1 and 3

Ans. A

Sol. It is slower one.

-any error introduced in integration phase cancels out de-integrate phase.

-Effect of noise is minimum.

179. For a Galvanometer having Resistance of 2000 Ω. A shunt resistance in used with galvanometer having Resistance R_{sh} = 400 Ω . Then calculate the multiplying factor of the galvanometer.

A. 4 B. 5

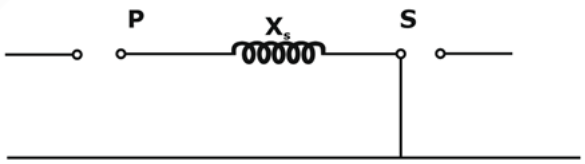
C. 6 D. 8

Ans. C

Sol. Multiplying factor of galvanometer

$$M = 1 + \frac{R_m}{R_{sh}} = 1 + \frac{2000}{400} = 6$$

180. The zero-sequence impedance of a 3-φ transformer is shown below. The connection of its winding are:



A. Delta – Delta

B. Star – Star, both ungrounded

C. Star – Delta with star Bide ungrounded

D. Delta – Star with star grounded

Ans. C

Sol. From the figure it can be san as:

Primary side is open:

Hence, primary side is connected in star (ungrounded) Secondary side is short:

Hence, secondary side is connected in delta.

The connection will be star – delta with star ungrounded.

181. Consider the signal

$$y(t) = \int_{-\infty}^{-6t/7} x(t)dt$$

This signal is

A. Linear and time invariant

B. Linear and time variant

C. Non-linear and time invariant

D. Non-linear and time variant

Ans. B

Sol. For linearity;

Whenever there is an introduction of integration in a signal then that signal is always be linear.

For time variance;

Since this signal is time scaled, so it is time variant.

182. The following Boolean expression xyz+ yz + xz can be reduced to

A. X's compliment

B. Y

C. Z

D. (x+y)z

Ans. D

Sol. G = xyz + yz + xz

= yz (x + 1) + xz ∵ x + 1 = 1

G = z(x + y)

183. A system has the following transfer function:

$$G(s) = \frac{1}{s^2 + 0.1s + 1}$$

If step input is applied to this system, then its setting time within 5% tolerance band will be

A. 60 sec

B. 40 sec

C. 20 sec

D. 10 sec

Ans. A

Sol. $G(s) = \dfrac{1}{s^2 + 0.1s + 1}$

Characteristic equation

$S^2 + 0.1s + 1 = 0$

$\Rightarrow 2\xi\omega_n = 0.1, \omega_n^2 = 1$

$\Rightarrow \xi = 0.05$

Setting time, $t_s = 3.\dfrac{1}{\omega_n \xi}$

$= \dfrac{3}{0.05} = 60\,\text{sec}.$

184. The stator and the rotor of a 3.phase, 4.pole wound rotor induction motor are excited, respectively, from a 50 Hz and a 30 Hz source of appropriate voltage. Neglecting all losses, what is/are the possible no load speed/speeds at which the motor would run?

A. 1500 rpm and 900 rpm
B. 2400 rpm and 600 rpm
C. 2400 rpm only
D. 600 rpm only

Ans. B

Sol. N_S (Stator field), $= \dfrac{120 \times 50}{4} = 1500\,\text{rpm}$

N_S (rotor field), $= \dfrac{120 \times 30}{4} = 900$ rpm

Speed of the rotor will be the relative speed between stator magnetic field and rotor magnetic field.

$N_r = 1500 \pm 900 = 2400$ rpm, 600 rpm

185. A bulb is a staircase has two switches one switch being at the ground floor and the other one at the first floor. The bulb can turn on and also can be turn off by any on switches irrespective of the state of other swiitch. The logic can be explained by:

A. an AND gate
B. an OR gate
C. an XOR gate
D. a NAND gate

Ans. C

Sol. Truth Table:

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

$y = \bar{A}B + A\bar{B}$

$y = A \oplus B$

Hence, logic is XOR gate.

186. A certain SCR is rated 500V, 100A. What is the number of series SCRs required for a string of 10 kV, 100A, if the derating factor is 15%?

A. 17 B. 20

C. 24 D. 30

Ans. C

Sol. $D \cdot F = 1 - \eta$

$\therefore \eta = 1 - D \cdot F = 1 - 0.15 = 0.85$

$$\%\eta = \frac{\text{actual voltage rating of whole storing}}{(\text{Individual voltage rating of one SCR}) \times (\text{No.of SCR})} \times 100$$

$$0.85 = \frac{10 \times 10^3}{500 \times \eta_s}$$

Number of SCR's required in series

$$\eta_s = \frac{10 \times 10^3}{500 \times 0.85} = 23.53 \simeq 24$$

187. An aquadag coating is used is a CRO to collect:

A. Primary electrons

B. Secondary emission electrons

C. Both primary and secondary emission electrons

D. None of the above

Ans. B

Sol. Aquadag coating is used to collect secondary electron emitted when the electron strikes the screen.

188. A single phase 230 V induction watt hour meter is connected to a load which draws 16 A current at 0.8 p.f. If the speed of rotation of the energy disc was 20 rpm, then the value of meter constant in revolution per kWh will be

A. 560.8 B. 407.6

C. 480.4 D. 503.2

Ans. B

Sol. Power absorbed by load = VI cosφ

= 230 × 16 × 0.8

= 2.944 KW

Number of revolution in one minute = 20

Number of revolution in one hour = 20 × 60 = 1200

Energy consumed in KWhr = 2.944 KWhr

No. of revolutions per KWhr = meter constant = $\frac{1200}{2.944} = 407.61$

189. What is series resistance required to extend the 0-50V range of 50 k Ω/V meter to 0 — 2000 volt.

A. 100 M Ω
B. 97.5 M Ω
C. 2.5 M Ω
D. 200 M Ω

Ans. B

Sol. Sensitivity = 50 k Ω / volt

So at 1 V → 50 k Ω (resistance is required)

at 50 V → 50 × 50 k Ω (resistance is required)

$R_{initial}$ = 2500 k Ω

$R_{initial}$ = 2.5 k Ω

Now to extend the range 0 — 2000 V

R_{total} = 50 × 2000 k Ω

100 M Ω

So $R_{external} = R_{Total} - R_{initial}$

(100 — 2.5) M Ω

So $R_{external} = R_{Total} - R_{initial}$

(100 — 2.5) M Ω

$R_{external}$ = 97.5 M Ω

190. Which of the following is defining the nyquist sampling rate?

A. $\omega_s = \omega_m$
B. $\omega_s = 2\omega_s$
C. $\omega_s = \frac{1}{2}\omega_m$
D. $\omega_s = 2\omega_m$

Ans. D

Sol. X (jω) = 0 for all |ω| > ω_m

$\omega_s \geq 2\omega_m$

$\omega_s = 2\omega_m$ is called Nyquist sampling rate.

191. If $|V_S| = |V_R|$ = 132 KV for there phase transmission and reactance is 12 ohm/phase, then the maximum power transmission per phase will be:

A. 1452 MW
B. 484 MW
C. 4356 MW
D. 0 MW

Ans. B

Sol. Since resistance of the live is: R = 0 and X = 12 Ω / phase.

Power transmission is, $P_R = \frac{|V_S||V_R|}{X}\sin\delta$

For maximum power, δ = 90°.

$P_{R\,max} = \frac{|V_S|V_R|}{X} = \frac{132 \times 132}{12}$ MW

P_{Rmax} = 1452 MW

$$\text{per phase;} = \frac{P_{R\,max}}{3} = 484\text{MW}$$

192. If the differential voltage gain and the common mode voltage gain of a differential amplifier are 48 dB and 4dB respectively, then what is the value of CMRR?

A. 40dB B. 44dB

C. 42dB D. 24dB

Ans. B

Sol. $\text{CMRR} = 20\log_{10}\frac{A_{DM}}{A_{CM}}$

= 20 $\log_{10}$ A_{DM} – 20 $\log_{10}$ A_{CM}

We have given 20 $\log_{10}$ A_{DM} = 48 dB

20 $\log_{10}$ A_{CM} = 40 dB

So, CMRR = 48 – 4 = 44dB

193. A 4 KVA, 400/200V, 1-phase transformer has leakage impedance of 0.02 + j0.04 per unit. The leakage impedance in Ohm when referred to HV side.

A. 0.8 + j 1.6 B. 0.4 + j 0.8

C. 0.02 + j 0.04 D. 4 + j 16

Ans. A

Sol. $$\text{Base impedance} = \frac{V^2}{VA} = \frac{400 \times 400}{4000} = 40\ \Omega$$

Leakage impedance referred to hv side

= (0.02 + j 0.04) × 40

= (0.8 + j 1.6) Ω

194. Parallel branch elements can be found out in a 1-φ transformer by conducting:

A. Short-circuit test B. Open circuit test

C. Both OC and SC test D. None of these

Ans. B

Sol. For determining parallel or shunt branch elements (R_c and X_m), we perform open circuit test at rated voltage and frequency.

195. A 200 KV, 0.20 μsec rectangular surge on a transmission line has surge impedance of 400Ω. If appeached a generating station with capacitance of 500 pF. The transmitted voltage will be

A. 126. 424 KV B. 252. 848 KV

C. 147.151 KV D. 73.57 KV

Ans. B

Sol. Transmitted voltage is,

$V_t = 2V_i[1-e^{-1}/Z_sC]$

Where, $V_i = 200$ KV, $Z_s = 400$, $C = 500 \times 10^{-12}$ F

$V_t = 2 \times 200\ (1 - e^{-0.2 \times 10-6}/400\times500 \times 10^{-12})$ KV

$V_t = 252.818$ KV

196. A signal $x(t) = 5 + 2\cos(\omega_0 t) + 4\cos(2\omega_0 t)$ is Fourier transformed. The number of spectral lines in the Fourier transformed signal are:

A. 4 B. 3

C. 5 D. 6

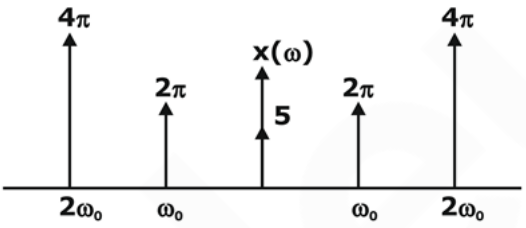
Ans. C

Sol. $x(t) = 5 + 2\cos(\omega_0 t) + 4\cos(2\omega_0 t)$

By Fourier transform:

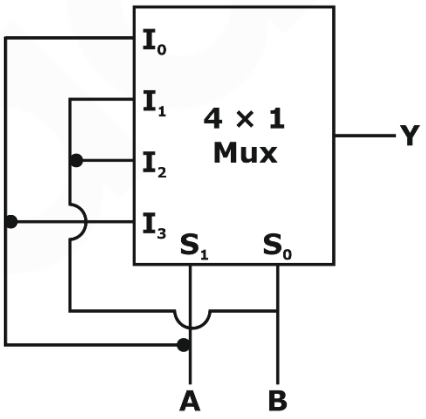
$X(\omega) = 5\delta(\omega) + 2\pi[\delta(\omega + \omega_0) + \delta(\omega - \omega_0] + 4\pi[\delta(\omega + 2\omega_0) + 8(\omega - 2\omega_0)$

By drawing the fourier transformed signal:



Hence, there are 5 spectral lines

197. A gate with two inputs (A, B and one output is implemented using a 4 × 1 MUX as shown in the figure below.



Then the function 'Y' is equal to

A. A – B B. A + B

C. A D. B

Ans. D

Sol. The expression of Y can be written as:

$$Y = (A)\overline{A}\overline{B} + (B)\overline{A}B + (B)A\overline{B} + (A)AB$$

$$Y = \overline{A}B + AB = B$$

198. A 3-phase, 20 MVA, 10 kV alternator has internal reactance of 5% and negligible resistance. The external reactance per phase to be connected in series with the alternator so that steady current on short circuit does not exceed 8 times the full load current is

A. 1.2 Ω
B. 0.075 Ω
C. 0.98 Ω
D. 0.37 Ω

Ans. D

Sol. Full load current = IFL = $\frac{20\times10^6}{\sqrt{3}\times10\times10^3} = 1154.7A$

As the short circuit current is to be 8 times the full load current

∴total percentage reactance required

$= \frac{\text{full load current}}{\text{short circuit current}}\times100$

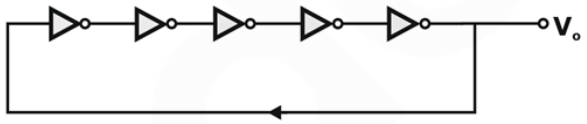
$= \frac{1}{8}\times100 = 12.5\%$

∴external percentage required

= 12.5 – 5 = 7.5% i.e 0.075 pu

$X_{\text{onmic value}} = x_{pu}\times\frac{(KV)^2}{MVA} = 0.075\times\frac{10^2}{20} = 0.375\Omega$

199. For the given ring oscillator the propagation delay of each inverter is 2msec. What is the fundamental frequency of the output?



A. 100 Hz
B. 50 Hz
C. 0.5 Hz
D. 0.1 Hz

Ans. B

Sol. N = 5

$t_{Pd} = 2\times10^{-3}$ sec

$f = \frac{1}{2\times N\times t_{pd}} = \frac{1}{2\times5\times2\times10^{-3}}$

f = 50 Hz

200. If the Laplace transform of a signal y(t) is $Y(s) = \frac{1}{s^2(s-2)}$, then its final value is

A. –1/2
B. 1/2
C. 0
D. Unbounded

Ans. D

Sol. Final value theorem is applicable only when all the poles of system lie in left half of s-plane.

∵ S = 2 is right-side pole.

∴ Unbounded.

****

Upcoming Mega Mock Challenge in May Month

SSC JE, UPPSC AE & VIZAG Steel MT 2020

Electrical Engineering

Exam	Live Date	Syllabus	No. of Questions	Time
SSC JE	09 May 2020	Full Syllabus (Technical & Non-technical)	200	120
UPPSC AE Paper-1	16 May 2020	Full Syllabus (Technical & Non-technical: Hindi)	125	150
UPPSC AE Paper-2	23 May 2020	Full Syllabus (Technical & Non-technical: General Studies)	125	150
VIZAG Steel MT 2020	30 May 2020	Full Syllabus (Technical & Non-technical)	200	120

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