



SSC JE 2019-20

Electrical Engineering

Mega Mock
Challenge

(27 Mar - 28 Mar 2020)

Questions &
Solutions

1. In the following question, which one of the given responses would be a meaningful order of the following?

- 1. Reading
- 2. Listening
- 3. Writing
- 4. Speaking

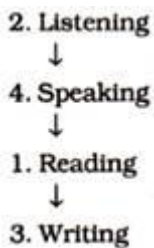
- A. 4, 2, 1, 3
- C. 2, 4, 1, 3

- B. 2, 4, 3, 1
- D. 4, 3, 2, 1

Ans. C

Sol. The order shows stages the way a child goes the learning phase: A child first listens to people which enables him to start speaking after that they are taught to read stuff from various sources, recognize alphabets and other things which ultimately helps them in writing on their own what they listen, speak and read.

So, the meaningful order of words will be:



Thus the correct order is 2, 4, 1, 3.

Hence, the correct option is C.

2. Which one of the given responses would be the meaningful order of the following words?

- 1) Consultations
- 3) Doctor
- 5) Recovery

- 2) Illness
- 4) Treatment

- A. 2, 3, 1, 4, 5
- C. 4, 3, 1, 2, 5

- B. 2, 3, 4, 1, 5
- D. 5, 1, 4, 3, 2

Ans. A

Sol. Clearly, illness occurs first, then the person goes to the doctor and after consultation with the doctor, the person then undergoes treatment to finally attain recovery. Thus, the correct order is 2,3,1,4,5.

Hence, the correct option is A.

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

- 1. Dramp
- 3. Dragbar
- 5. Drail

- 2. Drabbet
- 4. Draug

- A. 1, 3, 4, 5, 2
- C. 2, 3, 5, 1, 4

- B. 1, 3, 2, 4, 5
- D. 4, 3, 1, 2, 5

Ans. C

Sol. Here, the correct order is as follows:

- 2. Drabbet
- 3. Dragbar
- 5. Drail
- 1. Dramp
- 4. Draug

Hence, the correct option is C.

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

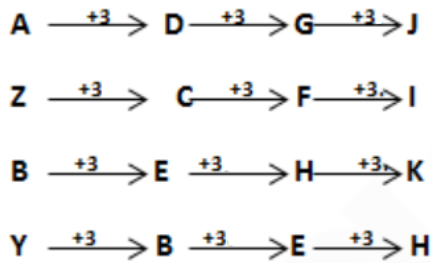
AZBY, DCEB, GFHE, ?

- A. JIHK
- C. JKIH

- B. JIKH
- D. JHIK

Ans. B

Sol. The series will be,



Thus, AZBY, DCEB, GFHE, JIKH

Hence, the correct option is B.

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

IM, JO, KQ, LS, ?

- A. NV
- C. MY

- B. MU
- D. NT

Ans. B

Sol.

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

$I + 1 = J, J + 1 = K, K + 1 = L, L + 1 = M$

$M + 2 = O, O + 2 = Q, Q + 2 = S, S + 2 = U$

Hence, the correct option is B.

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

MAN, ODR, QGV, SJZ, ?

A. UMD

B. VNC

C. UNC

D. VMD

Ans. A

Sol.

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

$M + 2 = O, O + 2 = Q, Q + 2 = S, S + 2 = U$

$A + 3 = D, D + 3 = G, G + 3 = J, J + 3 = M$

$N + 4 = R, R + 4 = V, V + 4 = Z, Z + 4 = D$

Hence, the correct option is A.

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

ABC, BDF, CFI, ?

A. DLH

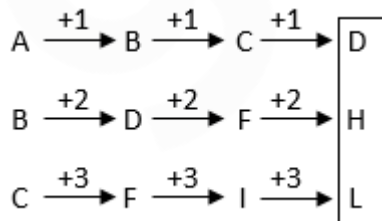
B. LDH

C. DIL

D. DHL

Ans. D

Sol. As,



Thus the next term in the series is DHL.

Hence, the correct option is D.

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

84, 42, 28, 21, ?

- A. 10.5
- B. 16.8
- C. 18.4
- D. 19.6

Ans. B

Sol. $(84 \div 2) \times 1 = 42$
 $(42 \div 3) \times 2 = 28$
 $(28 \div 4) \times 3 = 21$
 $(21 \div 5) \times 4 = 16.8$

Thus the next number in the series is 16.8

Hence, the correct option is B.

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

127, 63, 31, 15, 7, ?

- A. 2
- B. 3
- C. 4
- D. 5

Ans. B

Sol. $127 - 1 = 126$; $126 \div 2 = 63$,
 $63 - 1 = 62$; $62 \div 2 = 31$,
 $31 - 1 = 30$; $30 \div 2 = 15$,
 $15 - 1 = 14$; $14 \div 2 = 7$,
 $7 - 1 = 6$; $6 \div 2 = 3$

Thus the next number in the series will be '3'.

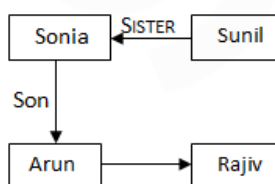
Hence, the correct option is B.

10. Rajiv is the brother of Arun. Sonia is the sister of Sunil. Arun is the son of Sonia. How is Rajiv related to Sunil?

- A. nephew
- B. son
- C. brother
- D. father

Ans. A

Sol. From the information given in the question,



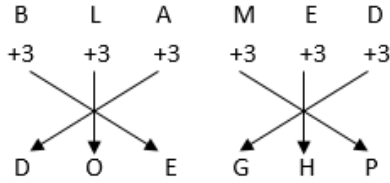
Clearly, Rajiv is the nephew of Sunil.

Hence, the correct option is A.

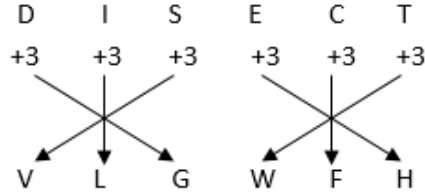
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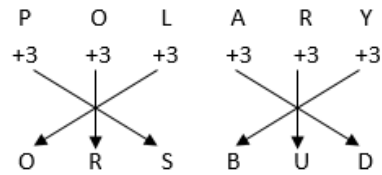
Sol. As,



And



Similarly,



Thus POLARY is coded as ORSBUD.

Hence, the correct option is B.

15. Which of the following interchanges of signs and numbers would make the flowing equation correct?

18 - 8 ÷ 12 × 6 + 10 = 12

- A. × and ÷, 12 and 6
- B. + and -, 8 and 10
- C. + and -, 6 and 8
- D. × and -, 18 and 6

Ans. C

Sol. By checking Option A,

18 - 8 ÷ 12 × 6 + 10 = 12

After changing the symbols,

18 - 8 × 6 ÷ 12 + 10

Applying BODMAS we get,

= 18 - 4 + 10

= 14 + 10

= 24

Therefore, 18 - 8 ÷ 12 × 6 + 10 = 12 is not the correct equation.

By checking Option B,

18 - 8 ÷ 12 × 6 + 10 = 12

After changing the symbols,

18 + 10 ÷ 12 × 6 - 8

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Applying BODMAS we get,

$$= 18 + 5 - 8$$

$$= 23 - 8$$

$$= 15$$

Therefore, $18 - 8 \div 12 \times 6 + 10 = 12$ is not the correct equation.

By checking Option C,

$$18 - 8 \div 12 \times 6 + 10 = 12$$

After changing the symbols,

$$18 + 6 \div 12 \times 8 - 10$$

Applying BODMAS we get,

$$= 18 + 4 - 10$$

$$= 22 - 10$$

$$= 12$$

Therefore, $18 - 8 \div 12 \times 6 + 10 = 12$ is the correct equation.

As, we found the correct answer, so no need to check more options.

Hence, the correct option is C.

16. If RULE is written as 60, GAME is written as 30, then HOPE will be written as?

A. 50

B. 48

C. 44

D. 52

Ans. B

Sol. In this question, we show that-

Adding the place value of the letters of the word RULE -

$$18 + 21 + 12 + 5 = 56$$

Now again adding 4 to it = $(56 + 4) = 60$

For GAME -

$$7 + 1 + 13 + 5 = 26$$

Now again adding 4 to it = $(26 + 4) = 30$

For HOPE -

$$8 + 15 + 16 + 5 = 44$$

Now again adding 4 to it = $(44 + 4) = 48$

Hence, the correct option is B.

17. If 'B × C' means 'B is the daughter of C', 'B + C' means 'B is the husband of C' and 'B - C' means 'B is the sister of C', then what does 'X + Y - Z × U' mean ?

A. X is the brother - in - law of U

B. X is the uncle of U

C. X is the son-in-law of U

D. U is the mother-in-law of X

Ans. C

Sol. Different symbols used to draw a family tree,

Symbol in Diagram	○	□	=	^	
Meaning	Female	Male	Married Couple	Siblings	Difference of A Generation

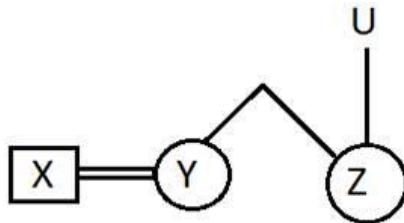
'B × C' means 'B is the daughter of C',

'B + C' means 'B is the husband of C'

'B - C' means 'B is the sister of C'

B is	×	Daughter	of C
	+	Husband	
	-	Sister	

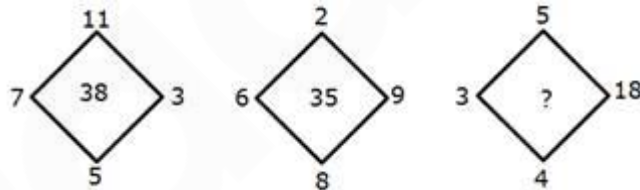
$X + Y - Z \times U \Rightarrow X$ is the husband of Y , Y is the sister of Z , Z is the daughter of U .



Clearly, X is the son-in-law of U .

Hence, the correct option is C.

18. In the following question, select the missing number from the given alternatives.



- A. 41
- B. 32
- C. 49
- D. 37

Ans. D

Sol. 1st Figure:

$$[(7 \times 3) + (11 \times 5)] \times 0.5$$

$$= [21 + 55] \times 0.5$$

$$= 76 \times 0.5 = 38$$

2nd Figure:

$$[(6 \times 9) + (2 \times 8)] \times 0.5$$

$$= [54 + 16] \times 0.5$$

$$= 70 \times 0.5 = 35$$

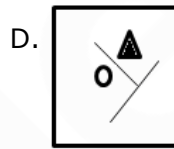
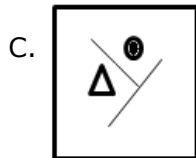
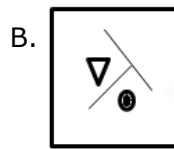
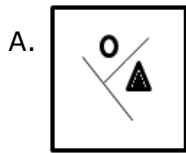
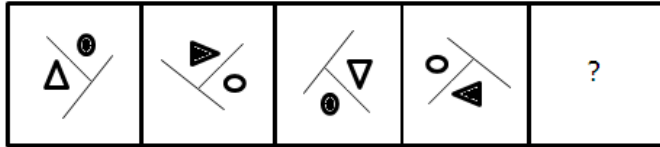
Similarly,

3rd Figure:

$$\begin{aligned} & [(3 \times 18) + (5 \times 4)] \times 0.5 \\ &= [54 + 20] \times 0.5 \\ &= 74 \times 0.5 = 37 \end{aligned}$$

Hence, the correct option is D.

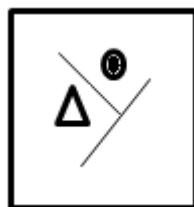
19. Select the figure that will come next in the following figure series.



Ans. C

Sol. After carefully observing the figures given in the question, it is very clear that the answer figure(C) will be the next figure.

Logic- whole shape moves 90 degree right in each step, triangle and bubbles gets whitened and darken alternately.



Hence, the correct answer is option C.

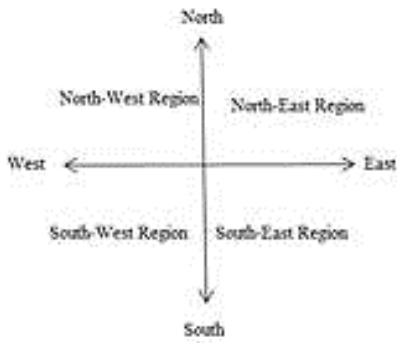
20. Pinki moves 30m in the west direction from her house. Now she turned her left and moves 70m and again turned left and moves 85m. Now she took left turn and moves 70m. Now how far she is from her house?

- A. 55m
- C. 65m

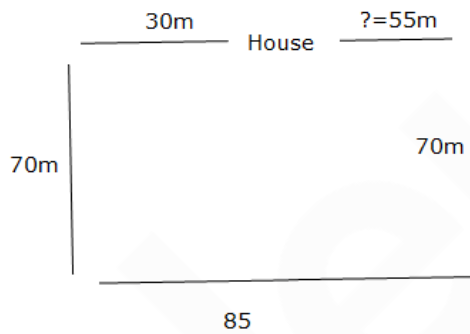
- B. 50m
- D. 60m

Ans. A

Sol. We know that:



We can show the given data in the following figure:



Required distance = $85 - 30 = 55\text{m}$

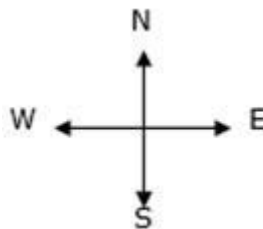
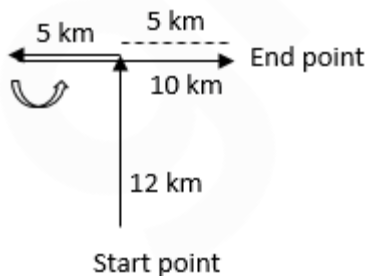
Hence, the correct option is A.

21. A travels 12 km towards north and then takes a left turn and covers another 5 km. From there, he turns 180 ° anticlockwise and travels 10 km further. What is the minimum distance between his initial and final position?

- A. 8 km
- B. 13 km
- C. 6 km
- D. 12 km

Ans. B

Sol.



Thus applying Pythagoras theorem distance between initial and final position

is $\sqrt{5^2 + 12^2} = 13 \text{ km}$.

Hence, the correct option is B.

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22. Two statements are given, followed by three conclusions numbered I, II and III. Assuming the statements to be true, even if they seem to be at variance with commonly known facts, decide which of the conclusions logically follow(s) from the statements.

Statements:

Some males are swimmers.

All swimmers are athletes.

Conclusions:

I. Some athletes are males.

II. No athlete is male.

III. Some athletes are swimmers.

A. Only conclusions I and III follow

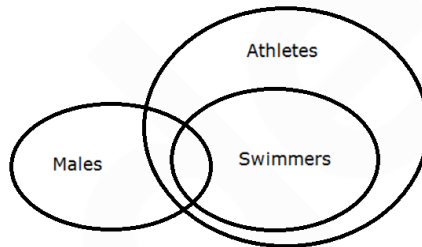
B. All of the conclusions follow.

C. Only conclusions I and II follow.

D. Only conclusions II and III follow.

Ans. A

Sol. The least possible Venn-diagram is-



Conclusions:

I. Some athletes are males - (It is a definite case hence true).

II. No athlete is male - (It is not a definite case hence false).

III. Some athletes are swimmers - (It is a definite case hence true).

So, only conclusions I and III follow.

Hence, the correct option is A.

23. Two statements are given, followed by three conclusions numbered I, II and III. Assuming the statements to be true, even if they seem to be at variance with commonly known facts, decide which of the conclusions logically follow(s) from the statements.

Statements:

All teachers are researchers.

No researcher is unemployed.

Conclusions:

I. Some unemployed are teachers.

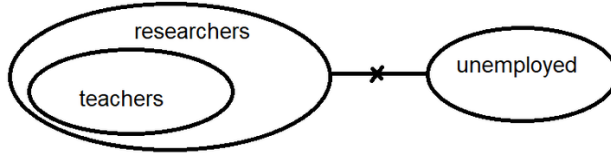
II. No teacher is unemployed.

III. Some teachers are unemployed.

- A. Only conclusion II follows.
- B. Only conclusion I follows.
- C. Only conclusions II and III follow
- D. Only conclusions I and III follow.

Ans. A

Sol. The least possible Venn-diagram is-



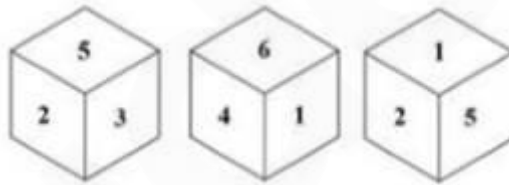
Conclusions:

- I. Some unemployed are teachers -(It is not a definite case hence false).
- II. No teacher is unemployed - (It is a definite case hence true).
- III. Some teachers are unemployed - (It is not a definite case hence false).

So, only conclusions II follows.

Hence, the correct option is A.

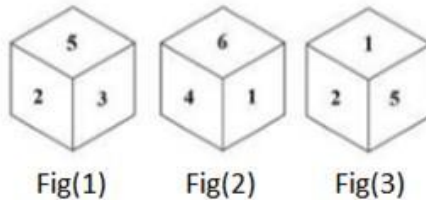
24. Three different position of the same dice are shown below. Which number is on the face opposite the face showing "4"?



- A. 5
- B. 3
- C. 2
- D. 6

Ans. A

Sol.



From fig(1) and fig(3), 2 and 5 are the consecutive side face of 3, also 2 and 5 are the consecutive side face of 1, therefore 3 is the opposite of 1.

From fig(2) and fig(3), 4, 6, 5, 2 are the consecutive side face of 1.

From 4, 6, 5, 2-

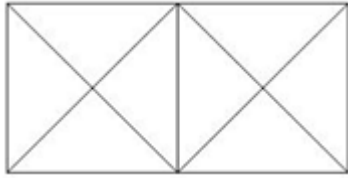
4 is opposite of 5 and 6 is opposite of 2.

Hence, the correct option is A.

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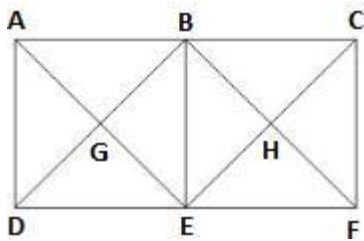
25. How many triangles are there in the given figure?



- A. 16
- B. 18
- C. 20
- D. 22

Ans. B

Sol.



The triangles that we get from the given figure are, ABG, BEG, DEG, DAG, BCH, CFH, EFH, EBH, ADE, ABE, DEB, ADB, BEC, BCF, EFB, EFC, BDF and AEC.

Thus we get 18 triangles.

Hence, option B is the correct answer.

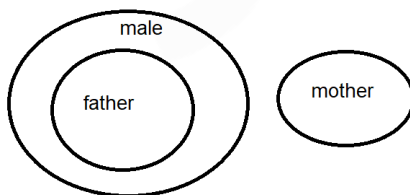
26. Identify the diagram that best represents the relationship among the given classes.

Father, Male, Mother

- A.
- B.
- C.
- D.

Ans. B

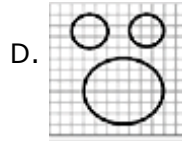
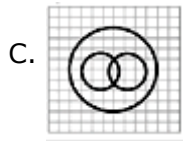
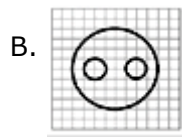
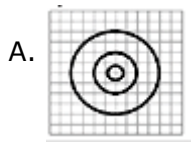
Sol. All fathers are male, while the mother is a separate unit so it will be represented by a different circle.



Hence, the correct option is B.

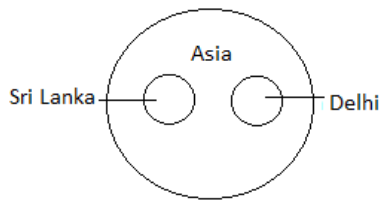
27. Identify the diagram that best represents the relationship among the given classes.

Delhi, Sri Lanka, Asia



Ans. B

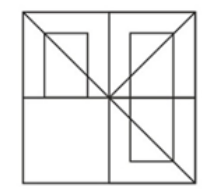
Sol.



Clearly, both Delhi & Sri Lanka are the part of Asia Continent.

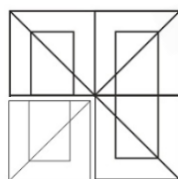
Hence, the correct option is C.

28. Which answer figure will complete the pattern in the question figure?



Ans. A

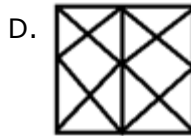
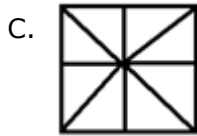
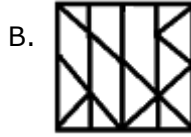
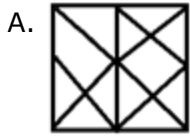
Sol.



Clearly, the figure in option A completes the pattern in the question figure.

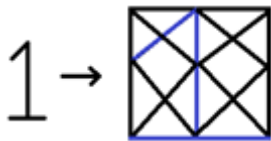
29. From the given answer figures, select the one in which the question figure is hidden/embedded.

1



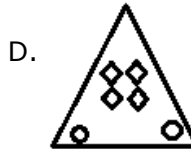
Ans. D

Sol.



After observing the given diagram carefully, option figure D has the given embedded figure.

30. The sequence of folding a piece of square paper (figure X and Y) and the manner in which the folded paper has been cut (figure Z) are shown. How will the paper appear when unfolded?



Ans. D

Sol. The paper is unfolded in two steps:

Step-1

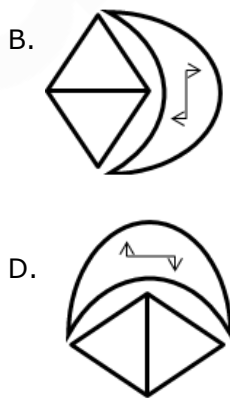
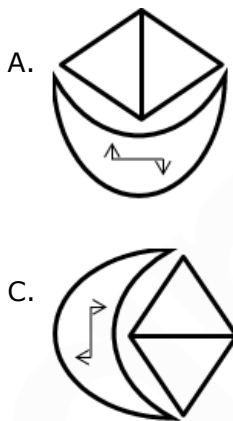
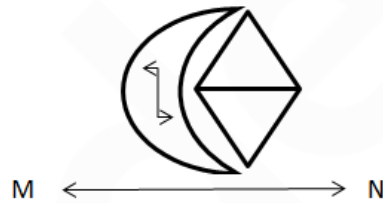


Step- 2



Hence, the correct option is D.

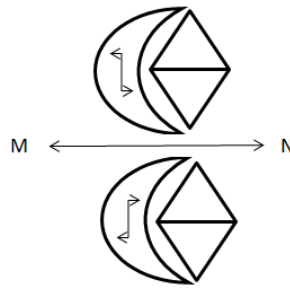
31. If a mirror is placed on the line MN, then which of the answer figures is the right image of the given figure?



Ans. C

Sol. In a plane mirror, a mirror image is a reflected duplication of a figure that appears almost identical, but it is reversed in the direction perpendicular to the mirror surface. As an optical effect it results from reflection of substances such as a mirror or water.

In this question figure, three symbol of infinity given, since, mirror image of infinity symbol remains same.



Hence, the correct option is C.

32. A statement is given followed by two course of action. The candidate is required to grasp the statement and analyses the problem or policy it mentions and then decide which course of action logically follows.

Statement:

Raju has topped his class in the 10th board examination.

Course of action:

- I. Raju went to school regularly and studied carefully throughout the session.
- II. Raju likes video games.

- A. Only I follows
- B. Only II follows
- C. Both I and II follow
- D. Either I or II follows

Ans. A

Sol. Course of action:

I. Raju went to school regularly and studied carefully throughout the session -(It follows as one needs to attend school regularly and study very carefully to obtain good marks in the examination and sometimes it leads to become top rank holders.)

II. Raju likes video games - (It does not follow as it doesn't affect his study.)

So, only I follow.

Hence, the correct option is A.

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

Happy : Sad :: Benevolent : ?

- A. Selfish
- B. Glowing
- C. Sympathetic
- D. Depressed

Ans. A

Sol. After observing the given words carefully, we can conclude that both the words are opposite to each other.

As, happy is the opposite of sad. Similarly, benevolent is the opposite of Selfish.

(Benevolent meaning - well-meaning and kindly.)

(Selfish meaning - lacking consideration for other people.)

Hence, the correct option is A.

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

Fossils : Creatures :: Mummies : ?

- A. Mothers
- B. Dead human
- C. Dried bodies
- D. Dead plants

Ans. B

Sol. As 'Fossils' are the remains of 'Creatures' dug up from earth in the same way 'Mummies' are the remains of the 'Human-beings' or dead bodies.

Hence, the correct option is B.

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

Chanakya : Politician :: Aryabhata : ?

- A. Literature
- B. Sanskrit
- C. Vikramaditya
- D. Mathematician

Ans. D

Sol. Chanakya was a famous politician and Aryabhata was a famous mathematician.

Hence, the correct option is D.

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

EGIK : JLNP :: DFHJ : ?

- A. IKMN
- B. IKOM
- C. IKMO
- D. IKMP

Ans. C

Sol. Let us first write down the alphabets and their corresponding positions in the English alphabetic series.

A	B	C	D	E	F	G	H	I	J
1	2	3	4	5	6	7	8	9	10
K	L	M	N	O	P	Q	R	S	T
11	12	13	14	15	16	17	18	19	20

U	V	W	X	Y	Z
21	22	23	24	25	26

Here, EGIK : JLNP may be written as,

$$E \xrightarrow{+5} J$$

$$G \xrightarrow{+5} L$$

$$I \xrightarrow{+5} N$$

$$K \xrightarrow{+5} P$$

Similarly,

$$D \xrightarrow{+5} I$$

$$F \xrightarrow{+5} K$$

$$H \xrightarrow{+5} M$$

$$J \xrightarrow{+5} O$$

Thus, (DFHJ : IKMO)

Hence, the correct option is C.

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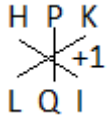
37. In the following question, select the related group of letters from the given alternatives.

HPK : LQI :: COT : ?

- A. UPD
- B. GPQ
- C. GPP
- D. VPR

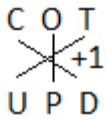
Ans. A

Sol. HPK : LQI => HPK is reversed ,KPH ,then each alphabet is replaced by next alphabet .



Similarly,

COT => UPD



Hence, the correct option is A.

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

BRIGHT : FWMLLY :: WINDOW : ?

- A. ANISBR
- B. ARNISB
- C. ANRISB
- D. ANRSIB

Ans. C

Sol. Let us first write down the alphabets and their corresponding position in the English alphabetic series.

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

B+4 = F

R+5 = W

I+4 =M

G+5 =L

H+4 =L

T+5 =Y

The alphabets are adding up by (+4) and (+5) alternatively.

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Similarly,

$$W+4 = A$$

$$I+5 = N$$

$$N+4 = R$$

$$D+5 = I$$

$$O+4 = S$$

$$W+5 = B$$

Hence, option C is correct.

39. In the following question, select the related number from the given alternatives.

$$7 : 350 :: 9 : ?$$

A. 738

B. 879

C. 768

D. 675

Ans. A

Sol. The relationship used in this question is : $x^3 + x$.

Here, 7: 350 may be represented as $7 : 7^3 + 7$

Similarly,

$$\Rightarrow 9 : 9^3 + 9 = 9 : 738$$

Thus, 738 is the required answer.

Hence, the correct option is A.

40. In the following question, select the related number from the given alternatives.

$$8743 : 44 :: 6545 : ?$$

A. 40

B. 45

C. 37

D. 42

Ans. A

Sol. In a pair second number is twice of the sum of digits of first number.

$$\Rightarrow \text{In } 8743 : 44$$

$$\Rightarrow (8 + 7 + 4 + 3) = 22 \times 2 = 44$$

In the similar way,

$$\Rightarrow (6 + 5 + 4 + 5) = 20 \times 2 = 40$$

41. Select the option that is related to the third term in the same way as the second term is related to the first term.

$$3360 : 15 :: 9240 : ?$$

A. 11

B. 21

C. 17

D. 25

Ans. B

Sol. The pattern is:

$$\begin{array}{r} 15^3 - 15 : 15 \\ 3375 - 15 : 15 \\ 3360 : 15 \end{array}$$

Similarly,

$$\begin{array}{r} 21^3 - 21 : 21 \\ 9261 - 21 : 21 \\ 9240 : 21 \end{array}$$

Hence, the correct option is B.

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

- | | |
|------------|------------|
| A. Grace | B. Relief |
| C. Cruelty | D. Charity |

Ans. C

Sol. Option C (Cruelty) is the antonyms of mercy and rest of the options A (Grace), option B (Relief) and option D (Charity) are the synonyms of mercy.

So, Cruelty is different from others.

Hence, the correct option is C.

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

- | | |
|-----------|-----------|
| A. Sofia | B. Zurich |
| C. Havana | D. Male |

Ans. B

Sol. From the given options,

Option B Zurich is the city of Switzerland, not capital.

Option A, Sofia is the capital of Bulgaria.

Option C Havana is the capital of Cuba.

Option D Male is the capital of Maldives.

So Zurich is different from others.

Hence, the correct option is B.

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

- | | |
|----------|-----------|
| A. Apple | B. Coffee |
| C. Juice | D. Tea |

Ans. A

Sol. Coffee, juice and tea are in liquid form but apple is in solid form.

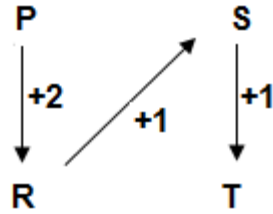
Hence, the correct option is A.

45. In the following question, select the odd letter group from the given alternatives.

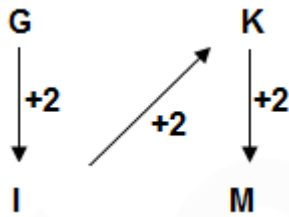
- A. PRST
- B. GIKM
- C. CEFG
- D. LNOP

Ans. B

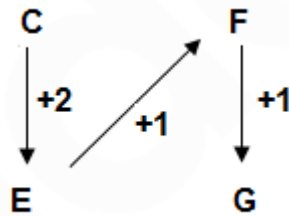
Sol. In option A -



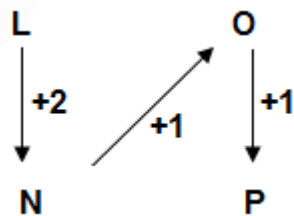
In option B -



In option C -



In option D -



Clearly, option B is not following the same pattern as other options.
Hence, the correct option is B.

46. In the following question, select the odd letters from the given alternatives.

- A. MK
- B. GE
- C. DB
- D. TQ

Ans. D

Sol. Option(A):

$$M \xrightarrow{-2} K$$

Option(B):

$$G \xrightarrow{-2} E$$

Option(C):

$$D \xrightarrow{-2} B$$

Option(D):

$$T \xrightarrow{-3} Q$$

Hence, option D is the correct response.

47. In the following question, select the odd letters from the given alternatives.

- A. EG
- B. SW
- C. MQ
- D. GK

Ans. D

Sol. EG → E is 5th alphabet, 5 is prime number, next prime number is 7, 7th alphabet is G.

SW → S is 19th alphabet, 19 is prime number, next prime number is 23, 23th alphabet is W.

MQ → M is 13th alphabet, 13 is prime number, next prime number is 17, 17th alphabet is Q.

GK → G is 7th alphabet, 7 is prime number, next prime number is 11, but K is 11th alphabet.

So, GK is the correct response.

Hence, the correct option is D.

48. Select the odd number from the given alternatives.

- A. 27
- B. 39
- C. 65
- D. 51

Ans. C

Sol. All are divisible by '3' except '65'.

Hence, the correct option is C.

49. Select the odd number from the given alternatives.

- A. 42
- B. 84
- C. 91
- D. 71

Ans. D

Sol. 71 is a prime number while others are not.

Hence, the correct option is D.

50. In the following question, select the odd number from the given alternatives.

- A. 67
- B. 87
- C. 97
- D. 11

Ans. B

Sol. Prime number is divisible by 1 and itself only. In the given question numbers 67, 97, 11 are prime number except 87.

So, 87 is the correct answer.

Hence, the correct option is B.

51. Which country has the world's largest reserves of Uranium?

- A. Canada
- B. India
- C. Australia
- D. USA

Ans. C

Sol. • Australia is considered to have the largest reserves of uranium in the world.

• Canada, Australia and Namibia are the leading countries in uranium production in the world.

• The world's largest uranium producing mine is Cigar Lake in Canada.

• The second-largest mine is Olympic Dam in Australia, with nearly 3,200 metric tons of uranium produced in 2018.

52. The deficiency of Sodium in the body is called as?

- A. Hypokalemia
- B. Hyponatremia
- C. Hypocalcemia
- D. Hypo Filariasis

Ans. B

Sol. The deficiency of sodium in the body is called Hyponatremia.

• Sodium is an essential electrolyte that helps maintain the balance of water in and around your cells.

• Normally, sodium level should be between 135 and 145 milliequivalents per liter (mEq/L).

• Severe hyponatremia can lead to coma and can be fatal.

• Adrenal insufficiency, hypothyroidism, and cirrhosis of the liver etc. are associated with Hyponatremia.

53. Menander and Nagasena's conversation were recorded in the book _____.

- A. Arthashastra
- B. Milindapanho
- C. Si-Yu-Ki
- D. None of these

Ans. B

Sol. • Menander reigned around 90-85 BC in Gandhara, north of modern Pakistan and parts of Afghanistan.

• It was Menander who has been mentioned as the mighty Yavana King of Sakala.

• Menander and Nagasena's conversation were recorded in the book Milindapanho or 'the questions of Milinda'.

54. In which year was the battle of Buxar fought?
A. 1765
B. 1758
C. 1764
D. 1757

Ans. C

Sol. • Battle of Buxar was fought in 1764.

- The battle was fought between British forces against the joint forces of Bengal, Awadh and Mughal Emperor.

The major participants of battle are as follow-

- Shuja-ud-daulah form Awadh
- Mir Qasim
- Shah Alam II – Mughal Emperor –
- Bengal Hector Munro and Robert Clive from British side
- The battle was won by British forces and eventually Treaty of Allahabad was signed in 1765.

55. Which compound is known as pearl ash?
A. Sodium Hydroxide
B. Potassium Carbonate
C. Sodium Nitrate
D. Liquid Hydrogen

Ans. B

Sol. Potassium Carbonate is known as pearl ash.

- Potassium carbonate is an inorganic compound with the formula K_2CO_3 .
- It is widely used in productions of soaps and glasses.
- It is also known as salts of tartar.
- Commercially it is produced by mixing Potassium hydroxide and carbon dioxide.
- It is also used as a drying agent, as a food ingredient, as a buffering agent, etc.

56. Phenyl, which is commonly used in toilets is basically a _____ product.
A. Isoprene
B. Sodium Thiosulphate
C. Benzene
D. Neoprene

Ans. C

Sol. • Phenyl which is commonly used in toilets is basically Benzene. It is nothing but hydroxylated benzene.

- The molecular formula of benzene is C_6H_6 .
- Phenyl is formed by abstraction of hydrogen atom from benzene.
- Benzene is a natural constituent of crude oil and is one of the elementary petrochemicals.

57. Who wrote the book "Making India awesome"?
A. Chetan Bhagat
B. Mohit Suri
C. Durjoy Datta
D. Anusha Bhagat

Ans. A

Sol. The book 'Making India Awesome' is written by Chetan Bhagat.

- In this book he analyses and provides inspired solutions to the country's most intractable problems—poverty, unemployment, corruption, violence against women etc.
- Some major works of Chetan Bhagat are- India Positive, The Girl In Room 105, What Young India Wants, Revolution 2020, 2 States, Three Mistakes of My Life etc.

58. Millerite is an ore of which element?

- A. Cadmium
- B. Uranium
- C. Silver
- D. Nickel

Ans. D

Sol. • Millerite is an ore of Nickel. It is a nickel sulphide mineral having compound formula NiS.

- It has a hardness of 3.5 on mohr's scale and exists in Hexagonal system.
- It was discovered by Wilhelm Haidinger in 1845.
- Other important ores of Nickel are- Pentlandite, Pyrrhotite, Garnierite and Niccolite.

59. What is the name of the movement which was led by Birsa Munda?

- A. Ulgulan
- B. Ahom
- C. Bhagatpanth
- D. Gadkari

Ans. A

Sol. Birsa started a movement called 'Ulgulan', or 'The Great Tumult'.

- Munda Rebellion is one of the prominent 19th century tribal rebellions in the subcontinent. Birsa Munda led this movement in the south region of Ranchi in 1899-1900.
- Birsa Munda did all this by the age of 25 when he died in a prison in Ranchi on June 9, 1900.

60. Acid rain mainly contains oxides of which elements?

- A. Sulphur and Nitrogen
- B. Phosphorous and Argon
- C. Carbon and Fluorine
- D. Antimony and Mercury

Ans. A

Sol. • The Acid rain mainly contains the oxides of Sulphur and Nitrogen.

- The oxides of nitrogen and sulphur are blown away by the wind along with the dust particles. They settle on the earth's surface after coming down in the form of precipitation.
- Acid rain has ph near 5.5 and is toxic to human health, Environment and Heritage monuments and buildings.
- Taj Mahal is largely affected by acid rain. It make the marble colour dull and also decreased it's strength.
- Robert Angus Smith was the first to show the relationship between acid rain and atmospheric pollution in Manchester, England in 1852.

61. 'Humpy Koneru' is associated with which of the following sports?

- A. Swimming
- B. Cricket
- C. Badminton
- D. Chess

Ans. D

Sol. • Humpy Koneru is an Indian chess grandmaster and current World Rapid Chess Champion.
• In 2002, She became the youngest woman ever to achieve the title of grandmaster at the age of 15 years.
• She was awarded the Arjuna Award in 2003 and the Padma Shri Award in 2007 by the Government of India.

62. Deepa Malik won the Rajiv Gandhi Khel Ratan Award 2019 belongs to which sports ?

- A. Cricket
B. Shot put
C. Boxing
D. Badminton

Ans. B

Sol. Bajrang Punia and Deepa Malik won the Rajiv Gandhi Khel Ratan Award 2019. She is the first Indian woman to win a medal in Paralympic Games and won a Silver medal at the 2016 Summer Paralympics in the shot put.

- Rajiv Gandhi Khel Ratan Award is the highest award in sports initiated in 1991-92.
- Vishwanathan Anand-the Chessmaster was the first recipient of the Rajiv Gandhi Award.
- Mirabai Chanu and Virat Kohli won this award in 2018.
- It is awarded annually by the Ministry of Youth Affairs and Sports.

63. A short circuit occurs as, current travel along an unintended path with _____.

- A. Very low electrical impedance
B. Impact of overvoltage
C. Very high electrical impedance
D. None of these

Ans. A

Sol. • A short circuit is simply a low resistance connection between the two conductors supplying electrical power to any circuit.

- The limitation on the current is due to the resistance or impedance of the load to which it is connected.
- If the resistance or impedance of the load is bypassed or shorted then an abnormally high current will flow through the circuit. This situation is called a short circuit.

64. Who appoints Advocate General of State in India?

- A. Governor of State
B. Chief Minister of State
C. Law Minister of State
D. No option is correct.

Ans. A

Sol. • The Governor appoints the Advocate General of the state.

- The Advocate General is the highest law officer in the state.
- He is responsible to assist the state government in all its legal matters.
- He defends and protects the interest of the state government. The office of the Advocate General in state corresponds to the office of Attorney General of India. Article 165 deals with the Advocate General for the State.

65. On 28th January 2020, Who was appointed as India's Ambassador to the USA?

- A. Reenat Sandhu
B. Manjeev Singh Puri
C. Vikas Swaroop
D. Taranjit Singh Sandhu

Ans. D

Sol. Taranjit Singh Sandhu was appointed as Indian Ambassador to the United States on 28 January 2020.

- He has previously served as Deputy Chief of Mission at Embassy of India in Washington D.C. from July 2013 to January 2017 and Consul General of India in Frankfurt from September 2011 to July 2013.
- He was the first secretary in Washington DC from 1997 to 2000.
- He also worked as deputy chief of mission at Washington DC from 2013 to 2017.

66. Matki Dance is prominent in which of the following state?

- A. Kerala
B. Andhra Pradesh
C. Gujrat
D. Madhya Pradesh

Ans. D

Sol. * Matki dance is performed using a small pitcher. This pitcher dance mainly belongs to the state of Madhya Pradesh.

- * It is usually performed solo by woman in various ceremonies.
- * The main musical instrument used in this dance is the dhol.

67. Which instrument is used to measure the depth of water?

- A. Fathometer
B. Anemometer
C. Ammeter
D. Alfalfa

Ans. A

Sol. • Fathometer is used to measure the depth of water.

- It is a depth finder that uses sound waves to determine the depth of water
- Fathometer is generally used on ships to determine the depth of water by measuring the time it takes a sound produced just below the water surface to return.

68. Which of following organelle is only found in plant cells?

- A. Peroxisome
B. Vacuole
C. Cytoplasm
D. Plastids

Ans. D

Sol. Plastids are only found in Plant cells.

- Plastids are responsible for manufacturing and storing of food, and contain pigments used in photosynthesis.
- The four main type of plastids are-
 - a) Chloroplasts – these are sites for process of photosynthesis.
 - b) Chromoplasts – responsible for different colours in plants and attracting pollinators.
 - c) Gerontoplasts – these are basically chloroplast with aging process
 - d) Leucoplasts – responsible for storage sheds for starches, lipids, and proteins.

69. Khed City is located in which of the following states of India?

- A. Arunachal Pradesh B. Maharashtra
C. Tamil Nadu D. West Bengal

Ans. B

Sol. • Khed City is an Industrial park in Pune, Maharashtra.

- It came into existence in the year 2010.
- It was formed under Khed Economic Infrastructure Ltd (KEIPL).
- With an area of over 4200 acres, Khed city is a joint venture between Kalyani group and Maharashtra industrial development corporation (MIDC).
- As of 2019, Khed City has over 47 domestic and multinational companies.

70. Chenda is which type of a musical instrument?

- A. Air Blown B. Percussion
C. Wired D. Multi wired

Ans. B

Sol. Chenda is a cylindrical percussion (pressing) musical instrument.

- It is popular in Kerala and some parts of Karnataka.
- It is made from the wood of jackfruit tree.
- Thrippekkulam Achutha Marar is famous Chenda player of country.
- There are three types of Chendas-
 - a) Uruttu Chenda - used to play variations in music. It is used to lead the orchestra.
 - b) Veekku Chenda - used to beat the basic rhythm
 - c) Acchan Chenda

71. Which International organization has designated 2020 as the Year of the Nurse and the Midwife to honor the 200th birth anniversary of Florence Nightingale?

- A. WHO B. UNICEF
C. UNESCO D. WLO

Ans. A

Sol. • World Health Organization (WHO) designated 2020 as the Year of the Nurse and the Midwife to honor the 200th birth anniversary of Florence Nightingale.

- The World Health Organization (WHO) is the collaborating partner in the three-year Nursing Now Campaign (2018–2020).
- The World Health Organization (WHO) is a specialized agency of the United Nations that is concerned with international public health.
- It was established on 7 April 1948.
- It is headquartered in Geneva, Switzerland.

72. Who is the richest person of world presently as per Forbes?

- A. Bill Gates
- B. Jeff Bezos
- C. Tim Cook
- D. Warren Buffet

Ans. B

Sol. As per Forbes, presently Jeff Bezos is the richest man of world.

- Presently Jeff Bezos has a net worth of 129 Billion dollars.
- He founded e commerce platform Amazon in 1994 and he remains CEO and owns a stake of 16%.
- He also owns the Washington Post and Blue Origin (an aerospace company).
- Bill gates is the second richest person presently with net worth of 113 Billion dollars.

73. Two main organs in the human body where the magnetic field produced are?

- A. Brain and Liver
- B. Brain and Heart
- C. Kidney and Pancreas
- D. Lung and Kidneys

Ans. B

Sol. Two main organs in the human body where the magnetic field produced are Brain and Heart.

- When we touch something, our nerves carry an electric impulse to the muscles we need to use and this leads to the production of magnetic fields in the body.
- This magnetic field produced in the body is very weak.
- The magnetic field inside the body forms the basis of obtaining the images of different body parts Like MRI etc.

74. The parameter which remains conserved in any collision is:

- A. Linear Momentum
- B. Kinetic Energy
- C. Angular Momentum
- D. Potential Energy

Ans. A

Sol. • If two objects collide, momentum will always be conserved

- In all types of collision, momentum is always conserved since total momentum of both the objects before and after the collision is same

75. United Nation Organization was established after the end of which war?

- A. Cold War
- B. World War 1
- C. World War 2
- D. None of these

Ans. C

Sol. • United Nation Organisation was established after the end of World War 2.

- The UNO was formed to maintain peace and security. It aimed to develop friendly relations among the nations and harmonize the actions of nations.
- The headquarters of UNO is in New York city.

76. In January 2020, the 31st International Kite Festival was launched in which state of India?
- A. Rajasthan
B. Goa
C. Maharashtra
D. Gujarat

Ans. D

Sol. * The 31st International Kite Festival was launched at the Sabarmati riverfront in Ahmedabad, Gujarat.

* It was inaugurated by Chief Minister Vijay Rupani.

* The festival was conducted from 7-14 January in different parts of the state.

77. What is the full form of NDA?
- A. National Democratic Assembly
B. National Democratic Alliance
C. National Disaster Agency
D. None of these

Ans. B

Sol. * The National Democratic Alliance (NDA) is a coalition of political parties in India established in 1998.

* It was formed as a coalition to contest the general elections.

* At the time of its formation in 1998, NDA Government was led by Bhartiya Janata Party (BJP) and 13 constituent parties.

* For the first time the coalition was in power from 1998 to 2004

* Currently, Amit Shah is the chairperson of NDA.

78. Who has been appointed as the first chairman of the National Medical Commission (NMC) in Jan 2020?
- A. Dr. Harshvardhan
B. Surendra Sinha
C. Suresh Chandra Sharma
D. Radha Mohan Krishna

Ans. C

Sol. • In January 2020, Suresh Chandra Sharma was appointed as the first chairman of the National Medical Commission (NMC).

• The Appointment Committee of the Cabinet approved the appointment of Suresh Chandra Sharma for three years.

• The governors of the Medical Council of India (MCI) appointed as the secretary of the Commission for a similar term.

79. The Indian Ocean Rim Association has how many member states?
- A. 12
B. 22
C. 52
D. 62

Ans. B

Sol. The Indian Ocean Rim Association is an international organization of 22 member states.

- It also has 9 Dialogue partners.
- It was formed in 1997; the vision of IORA was originated by Nelson Mandela when he visited India in 1995.
- To become members, States must adhere to the principles and objectives enshrined in the Charter of the Association.

80. What is the full form of CCTV?

- A. Circuit closed Television B. Closed Circuit Television
C. Closed Circuit Telecommunication D. Circuit Closed Telecommunication

Ans. B

Sol. * The full form of CCTV is Closed Circuit Television.

* CCTV is as known a video Surveillance and is the use of video camera for various Surveillances.

* It differs from broadcast television in that the signal is not openly transmitted.

81. Which one of the following is NOT an operating system?

- A. Linux B. Unix
C. Intel D. Windows

Ans. C

Sol. Intel is not an operating system.

- Intel Corporation is commonly known as Intel. It is an American multinational corporation and technology company.
- An operating system is the main software that allows different parts of a computer to work together by translating data from one part to another.
- Linux is a system used for tablet PC's, computer software and hardware and so on.
- Unix is a system usually used in universities, big enterprises, companies and so forth.

82. Nephrons are functional unit of which of the following organ?

- A. Heart B. Lungs
C. Kidney D. Brain

Ans. C

Sol. Nephrons are functional unit of Kidneys.

- Nephrons are composed of a renal corpuscle and a renal tubule.
- The renal corpuscle is the site of the filtration of blood plasma.
- The nephron functions through Ultrafiltration. Ultrafiltration occurs when blood pressure forces water and other small molecules through tiny gaps in capillary walls.

83. On 1st February 2020, the 34th Surajkund International Crafts Mela-2020 was inaugurated in_____.
- A. Haryana
B. Bihar
C. Madhya Pradesh
D. Rajasthan

Ans. A

Sol. President Ram Nath Kovind inaugurated the 34th Surajkund International Crafts Fair on February 1, 2020, in Faridabad, Haryana.

The Mela was organized by the Surajkund Mela Authority & Haryana Tourism in collaboration with Union Ministries of Tourism, Textiles, Culture and External Affairs.

Himachal Pradesh is the theme state of this year's (2020) Surajkund Mela.

Surajkund International Crafts Mela was organized for the first time in 1987.

84. Which of the following enzyme is secreted by pancreas?

- A. Pepsinogen
B. Pepsin
C. Trypsin
D. All of the above

Ans. C

Sol. • Trypsin is secreted by the pancreas. It is a proteolytic enzyme

- It is one of the three digestive proteinases along with pepsin and chymotrypsin which breaks down dietary protein molecules into simpler forms.
- Pancreatic proteases (such as trypsin and chymotrypsin) help to digest proteins.
- Pancreatic amylase helps to digest sugars (carbohydrates).
- Pancreatic lipase helps to digest fat.

85. During the freedom struggle, who was the only President of Indian National Congress who resigned from the presidency even after being elected?

- A. Nellie Sengupta
B. Jawaharlal Nehru
C. JB Kripalini
D. Subhash Chandra Bose

Ans. D

Sol. • During the freedom struggle, Subash Chandra Bose was the only President of Indian National Congress who resigned from the presidency even after being elected.

- In 1939, SC Bose was appointed the president of Congress, having defeated Pattabhi Sitaramaiya, 1580 to 1377 Votes.
- Sitaramiyya was supported by Gandhiji and his defeat is indirectly defeat of Gandhiji hence 13 members resigned from CWC after election of SC Bose as president.
- It was increasingly becoming difficult for Bose to work as the President and hence he resigned from the President ship in 1939.

86. What is the rank of India in the 2019 World Giving Index (WGI)?

- A. 86
B. 82
C. 102
D. 119

Ans. B

- Sol. • India got 82nd rank in World Giving Index 2019.
- It was released by the Charities Aid Foundation.
 - It aims to promote giving to transform lives and communities across the world. USA topped the list. Followed by Myanmar and New Zealand.
 - As per this report, India showed that 19 percentage people donated their time and 34 percentage helped a stranger.
 - India's neighbour Nepal ranker 53 and Pakistan ranker 69.

87. Who is the first woman to have been awarded the Yudh Seva Medal?

- A. Minty Agarwal B. Shaliza Dhama
C. Aparna Kumar D. Bhawana Kanth

Ans. A

- Sol. • Minty Agarwal is the first woman to have been awarded the Yudh Seva Medal.
- Minty Agarwal who provided Abhinandan Varthaman air support during 27 feb, 2019 to shoot down Pakistan F16.
 - The Yudh Seva Medal is one of India's military decorations for distinguished service during wartime.
 - Sarvottam Yudh Seva Medal is India's highest Wartime Distinguished Service decoration.
 - Bhawana Kant is the first woman fighter pilot to qualify to undertake combat missions.

88. Chairman of Legislative Council of States submits his resignation to _____?

- A. Governor B. Deputy Chairman
C. Chief Justice of High Court D. Chief Minister

Ans. B

- Sol. * Chairman of Legislative Council of States submits his resignation to the Deputy Chairman of Legislative Council.
- * The Legislative Council has two elected officials: the Chairman and Deputy Chairman.
 - * They are elected by the members of Legislative Council from amongst themselves.
 - * The Chairman, and in his absence the Deputy Chairman, presides over the meetings of the Legislative Council.
 - * The Legislative Council (Vidhan Parishad) is the upper house in those states of India that have a bicameral legislature; the lower house being the State Legislative Assembly.
 - * Its establishment is defined in Article 169 of the Constitution of India.

89. International Internet Day is annually celebrated on_____.

- A. 5th November B. 29th October
C. 7th December D. 8th October

Ans. B

Sol. * International Internet Day is annually celebrated on 29th October.

* Internet Day is an event celebrated in Mexico, Peru, Chile, Paraguay, Argentina, Spain, Colombia, Uruguay, Ecuador, Bolivia, Venezuela, and other parts of the world.

* It is promoted by the Association of Internet Users.

* It was celebrated for the first time on October 29th, 2005.

90. Which layer of earth's atmosphere contains electrically charged particles known as Ions?

- A. Exosphere
B. Stratosphere
C. Ionosphere
D. Mesosphere

Ans. C

Sol. The Ionosphere layer of earth contains electrically charged particles known as ions.

- The ionosphere is not a distinct layer. Instead, the ionosphere is a series of regions in parts of the mesosphere and thermosphere.

- The ionosphere is ionized by solar radiation.

- Due to the ability of ionized atmospheric gases to refract high frequency radio waves, this layer is vital for Radio communication.

91. Krishna deva Raya of Vijaynagar Empire belonged to which dynasty?

- A. Sangam
B. Saluva
C. Tuluva
D. Aravidu

Ans. C

Sol. * Krishna deva Raya of Vijaynagar Empire belonged to Tuluva Dynasty.”.

* Krishna Deva Raya earned the titles Kannada Rajya Rama Ramana, Andhra Bhoja and Mooru Rayara Ganda.

92. No Confidence Motion can be passed in?

- A. Only Lok Sabha
B. Only Rajya Sabha
C. Both Rajya and Lok Sabha
D. Neither A and B

Ans. A

Sol. No Confidence Motion can be passed only in Lok Sabha.

- The no confidence motion needs 50 members for support to be admitted in house.

- The motion is based on the fact under Article 75 which says that the council of ministers shall be collectively responsible to the Lok Sabha.

- It is not require to state reason for putting No Confidence Motion.

- It can be moved against the whole council of ministers only.

93. Which city is known as the 'Steel City of India'?

- A. Jamshedpur
B. Ranchi
C. Dhanbad
D. Hazaribagh

Ans. A

- Sol. • Jamshedpur is known as the 'Steel City of India'.
• The city is known by this name because the first steel plant was established here by the TATA company.
• It was the first industrial city in India, and almost the entire town works in the steel industry.
• It was founded by Jamsetji Tata (Founder of Tata Groups) and was also named after him.

94. Human Development Index is released by?

- A. UNDP
B. WB
C. IMF
D. WEF

Ans. A

Sol. The Human Development Index is developed by United Nations Development Programme.

- It is a part of Human Development Report published by UNDP.
- The focus of the 2019 Report is on 'Inequality in Human Development'.
- Human development index is measured on the basis of three basic dimensions, which are-
A long and healthy life,
Access to knowledge, and
A decent standard of living.

95. Which bank has announced the launch of a 'Cardless Cash Withdrawal' facility from its ATMs on 21 January 2020?

- A. HDFC
B. Bank of India
C. Punjab National Bank
D. ICICI

Ans. D

Sol. • ICICI Bank has announced the launch of a 'Cardless Cash Withdrawal' facility from its ATMs on 21 January 2020.

- ICICI Bank's Cardless Cash Withdrawal service will allow customers to withdraw cash from over 15,000 ATMs of the bank by raising a request on its mobile banking app, iMobile.
- ICICI Bank Limited is an Indian multinational banking and financial services company.
- It is headquartered in Mumbai, Maharashtra.
- It was established on 5th January 1994.

96. Who is the author of the book 'The Free Voice: On Democracy, Culture and the Nation'?

- A. Barkha Dutt
B. Rahul Kanwal
C. Ravish Kumar
D. Arnab Goswami

Ans. C

Sol. • 'The Free Voice: On Democracy, Culture and the Nation' is written by Ravish Kumar on 27 Feb 2018.

- Ramon Magsaysay Award was also won by Ravish Kumar in 2019 for journalism.
- He is also the first recipient of Gauri Lankesh Award for Journalism, awarded by Gauri Lankesh Memorial Trust.

97. A Compact Disk (CD) is which type of storage device?
- | | |
|---------------|------------------|
| A. Electrical | B. Optical |
| C. Magnetic | D. None of these |

Ans. B

- Sol. • A Compact Disk (CD) is an optical storage device.
- There are three main types of secondary storage in a computer system:
 - a) Solid state storage devices, such as USB memory sticks.
 - b) Optical storage devices, such as CD, DVD and Blu-ray discs.
 - c) Magnetic storage devices, such as hard disk drives

98. What is the full form of E in EPROM?
- | | |
|--------------|--------------|
| A. Effective | B. Endurable |
| C. Erasable | D. Effective |

Ans. C

Sol. The full form of EPROM is Erasable Programmable Read Only Memory.

* EPROM retains data when its power supply is switched off.

* The data of E-PROM is erased by shining an intense ultraviolet light through a window designed into memory chip. EPROMS are easily recognised by transparent fused quartz window in the top of the package, through which the silicon chip is visible.

99. In January 2020, the World's largest meditation centre was inaugurated in which state of India?
- | | |
|------------------|---------------------|
| A. Uttrakhand | B. Himachal Pradesh |
| C. Uttar Pradesh | D. Telangana |

Ans. D

Sol. • In January 2020, the World's largest meditation centre was inaugurated at Kanha Shanti Vanam in Hyderabad, Telangana.

- This centre is built to mark the 75th anniversary of the formation of Shri Ram Chandra Mission (SRCM) and Heartfulness Institute.

- It was inaugurated on 28th January 2020.

100. India is on _____ rank in military expenditure all over the world.
- | | |
|-----------|-----------|
| A. Second | B. Third |
| C. First | D. Fourth |

Ans. D

Sol. • India has risen to fourth place in global military spending rankings.

- According to this report the top five biggest spenders were the United States, China, Saudi Arabia and India.

101. A power supply has domestic load having a maximum demand of 1200 kW. If the diversity factor is 1.2 and demand factor is 0.9. Then find the connected domestic load ____?
- A. 1800 kW B. 1440 kW
C. 1600 kW D. 1500 kW

Ans. C

Sol. Diversity factor = $\frac{\text{sum of max . dem and of different domestic consumer}}{\text{max . domestic dem and}}$

Sum of max. demand of different domestic consumer = max. domestic demand X diversity factor

$$= 1200 \times 1.2 = 1440 \text{ kW}$$

Connected load

$$= \frac{1440}{\text{dem and factor}} = \frac{1440}{0.9} = 1600 \text{ kW}$$

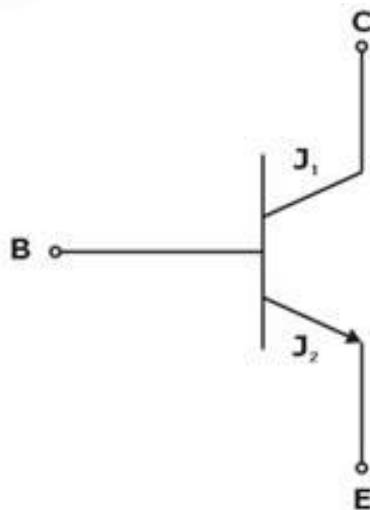
102. In resistance furnaces, the temperature can be controlled by
- A. Varying the applied voltage
B. Bucking and boosting secondary voltage
C. Changing the number of heating elements
D. All of these

Ans. D

Sol. In resistance furnaces, the temperature can be controlled by following methods:

- 1. Varying the applied voltage
- 2. Bucking and boosting secondary voltage
- 3. Changing the number of heating elements

103. Which one of the following statements is correct for the transistor is shown in figure? Such that the transistor to be operate in Active region.



- A. J_1 & J_2 forward bias
- B. J_1 Reverse bias J_2 forward bias
- C. J_1 & J_2 reverse bias
- D. J_1 forward bias & J_2 reverse bias

Ans. D

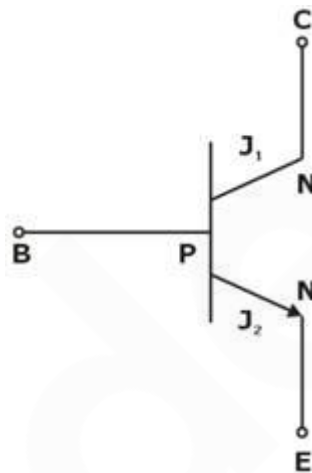
Sol. The given transistor is bipolar npn junction transistor. For a npn transistor to be used as an amplifier it must be operate in active region. Condition for a npn transistor to operate in active region.

(i) V_{BE} should be greater than zero i.e., Junction J_2 is forward bias.

(ii) $V_{CE} > V_{BE} \Rightarrow V_C - V_E > V_B - V_E$

Or $V_C > V_B$

Or $V_{CB} > 0$.



Which signifier that J_2 should be reverse bias.

NOTE: A Junction is formed by P-N terminals.

104. A 200 W, 200 V bulb and a 100 W, 200 V bulb are connected in series and the voltage of 400 V is applied across the series connected bulbs, under this condition
- A. 100 W bulb will be brighter than 200 W bulb
 - B. 200 W bulb will be brighter than 100 W bulb
 - C. Both the bulbs will have equal brightness
 - D. Both the bulbs will be darker than when they are connected across rated voltage

Ans. A

Sol. For 200 W, 200 V,

$$R_1 = \frac{200^2}{200} = 200 \Omega$$

For 100 W, 200 V,

$$R_2 = \frac{200^2}{100} = 400 \Omega$$

$$\text{Current } I = \frac{400}{200 + 400} = \frac{4}{6} = \frac{2}{3} \text{ A}$$

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For Bulb (1), power divided

$$= 200 \times \left(\frac{2}{3}\right)^2 = \frac{800}{9} \text{ W}$$

Bulb (2), power divided

$$= 400 \times \left(\frac{2}{3}\right)^2 = \frac{1600}{9} \text{ W}$$

Hence 100 W bulb will be brighter than 2000 W bulb.

105. Three inductors are connected in star whose inductance is 20 mH each. The value of each inductance when the circuit is transformed to delta connection?

- A. 20 mH
- B. 40 mH
- C. 30 mH
- D. 60 mH

Ans. D

Sol. $L_1 = L_1 + L_2 + \frac{L_1 L_2}{L_3}$

$$L_1 = L_2 = L_3 = 20 \text{ mH}$$

$$L_1 = 20 + 20 + \frac{20 \times 20}{20} = 60 \text{ mH}$$

106. How is the ballast resistance connected with the choke?

- A. Parallel
- B. Series
- C. Can be connected in either way
- D. None of these

Ans. B

Sol. A ballast resistor is a resistor inserted into a circuit to compensate for different changes. A resistor that has the property of increasing in resistance as current flowing through it increases and decreasing in resistance as current decreases. The ballast resistance is connected in series with the choke in order to prevent this, fluorescent tubes are connected to the power line through a ballast. The ballast adds positive impedance (AC resistance) to the circuit to counteract the negative resistance of the tube, limiting the current. The top is a high-power factor rapid start series ballast for two 30–40 W lamps.

107. In an insulated cable having core diameter d and overall diameter D. the ratio of maximum to minimum dielectric stress is given by

- A. $(D/d)^{1/2}$
- B. $(D/d)^2$
- C. D/d
- D. d/D

Ans. C

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Sol. Dielectric stress $\propto \frac{1}{\text{diameter}}$

$$\frac{\text{Maximum Dielectric stress}}{\text{Minimum Dielectric stress}} = \frac{D}{d}$$

108. According to the first law of illumination, the illumination of a surface due to a source of light is

- A. Inversely proportional to the distance between the surface and the source of light
- B. Inversely proportional to the square of the distance between the surface and the source of light
- C. Directly proportional to the distance between the surface and the source of light
- D. Directly proportional to the square of the distance between the surface and the source of light

Ans. B

Sol. According to the first law of illumination, the illumination of a surface due to a source of light is inversely proportional to the square of the distance between the surface and the source of light.

109. A cumulative compound DC generator is supplying 30 A at 300 V. Now if series field winding is short circuited, then the terminal voltage at constant speed operation.

- A. will raise to 350 V
- B. get a very high dangerous value
- C. remains the same
- D. will becomes less than 300 V

Ans. D

Sol. Since for a cumulative generator

$$\Phi = \phi_{sh} + \phi_{sc}$$

When series field winding gets short circuited

$$\Phi_{sc} = 0$$

$$\downarrow \phi = \phi_{sh}$$

Net flux in the DC machine decreases

$$E_g \propto N\phi \text{ for } N = \text{constant}$$

$$\downarrow E_g \propto \phi \downarrow$$

Due to decrement in the flux generated emf decreases.

So, the terminal voltage also decreases.

110. A parallel RLC circuit resonates at 100 KHz. At the frequency above the resonating frequency, the circuit behaves as

- A. Capacitive
- B. Inductive
- C. Resistive
- D. None of the above

Ans. A

Sol. In parallel RLC circuit, the circuit behaves as capacitive for the frequencies above the resonating frequency of the circuit.

111. The least expensive protection for low voltage system is _____.

- A. Vacuum circuit breaker
- B. Isolator
- C. Oil circuit breaker
- D. Fuse

Ans. D

Sol. In the comparison between the circuit breaker and fuse, fuse is the least expensive.

So, for the least expensive protection for low voltage system is fuse.

112. If the measured insulation value is more than unity what values should be taken as the maximum working value?

- A. 0.75 MΩ
- B. One MΩ
- C. 0.5 MΩ
- D. One ohm

Ans. B

Sol. If the measured insulation value is more than unity, then the maximum working value of insulation resistance is 1 MΩ.

113. In low oil circuit breaker, the oil performs the function of

- A. insulation only
- B. arc extinction only
- C. both insulation and arc extinction
- D. none of the above

Ans. B

Sol. In low oil circuit breaker, the oil performs the function of arc extinction only. Low | Minimum Oil Circuit Breaker Working Principle. When a fault occurs, the moving contact and fixed contact are get separated as current is flowing through the circuit, an arc is struck between them. The oil in arcing chamber attains a high temperature and vaporizes.

114. Creeping in a 1-φ Induction type energy meter may be due to

- A. Over voltage
- B. Stray magnetic field
- C. over-compensation for friction
- D. All the above

Ans. D

Sol. Creeping is a slow but continuous rotation of disc when only pressure coil is excited, but no current is flowing in the circuit. It can be caused due to overcompensation for friction, Vibration, stray magnetic field and over voltage.

115. The initial rate of rise of voltage across capacitor of capacitance 1F when suddenly connected to dc of current 3A

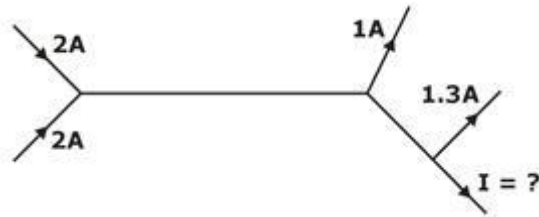
- A. 3 V/S
- B. 6 V/S
- C. 12 V/S
- D. zero

Ans. A

Sol. $C \frac{dv}{dt} = i$

$$\frac{dv}{dt} = \frac{3}{1} = 3 \text{ V/sec}$$

116. The current 'I' in the electric circuit shown below is?



- A. 3.7 A
- B. 1 A
- C. 2.7 A
- D. 1.7 A

Ans. D

Sol.



$$I = 3 - 1.3 = 1.7 \text{ A}$$

117. The self-inductance of two coils are 8 mH and 18 mH. If the co-efficient of coupling is 0.75, the mutual inductance of the coil is

- A. 8 mH
- B. 12 mH
- C. 16 mH
- D. 9 mH

Ans. D

Sol. $M = k\sqrt{L_1L_2}$

$$= 0.75\sqrt{8 \times 10^{-3} \times 18 \times 10^{-3}} = 9\text{mH}$$

118. If the number of turns of coil is doubled and length is halved what will be the new inductance of coil if the previous inductance was $(Z_1) = 0.5 \text{ mH}$.

- A. 8 mH
- B. 4 mH
- C. 16 mH
- D. 32 mH

Ans. B

Sol. $L = \frac{\mu_0\mu_r AN^2}{l}$

$$\frac{L_2}{L_1} = \frac{(2N)^2}{(l/2)N^2}$$

$$L_2 = 8L = 4\text{mH}$$

119. The V curve for 3 phase synchronous motor represents
- A. The variation of armature current with field excitation at constant mechanical power.
 - B. The variation of armature voltage with mechanical power at constant field excitation.
 - C. The variation of armature voltage with field excitation of constant mechanical power.
 - D. The variation of mechanical power with field excitation at constant speed.

Ans. A

Sol. The V curve for 3 phase synchronous motor represents the variation of armature current with field excitation at constant mechanical power.

120. The artificial source of light is
- A. Arc lamp
 - B. Incandescent lamp
 - C. Discharge lamp
 - D. All of these

Ans. D

Sol. The artificial source of light is:

1. Arc lamp
2. Incandescent lamp
3. Discharge lamp

121. High frequency eddy current heating is used for
- A. Melting of non-ferrous metals
 - B. High grade alloy steel production
 - C. Hardening the surfaces of materials being heated
 - D. Vacuum heating

Ans. C

Sol. High frequency eddy current heating is used for hardening the surfaces of materials being heated.

122. A salient-pole synchronous generator delivers 50% of rated power to an infinite bus. If its field excitation fails.
- A. generator does not able to deliver the active and reactive power to infinite bus
 - B. generator delivers reduced active and reactive power to the infinite bus
 - C. generator absorbs the reactive power but delivers reduced active power to the infinite bus
 - D. generator absorbs both the active and reactive power

Ans. C

Sol. since if field excitation is fails in synchronous generator, than it will act as induction generator.

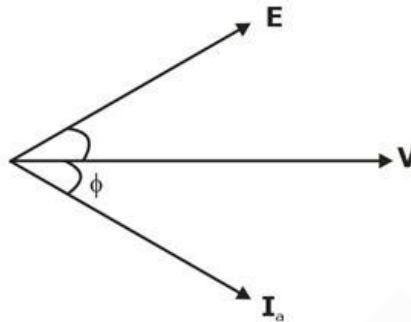
Induction generator absorbs the reactive power from bus but delivers the active power to the bus

123. What is the load angle in the alternator?

- A. It is the angle between the terminal voltage and armature current.
- B. It is the angle between the induced voltage and terminal voltage.
- C. It is the angle between the induced voltage and armature current.
- D. None of these

Ans. B

Sol.



Since Load angle is the angle between the induced voltage and the terminal voltage in alternator.

124. Back-up protection is generally used for protection against

- A. open-circuit faults only
- B. short-circuit faults only
- C. both open and short-circuit faults
- D. none of the above

Ans. B

Sol. Back-up protection is generally used for protection against short circuit faults only.

The backup protection is the second line of defence which isolates the faulty section of the system in case the main protection fails to function properly. The backup protection is mainly used where the main protection of the adjacent circuit is unable to backup the main protection of the given circuit.

125. What is the amount of charcoal and salt needed for GI pipe earthing?

- A. Charcoal 5 kg, salt 8 kg
- B. Charcoal 10 kg, salt 8 kg
- C. Charcoal 10 kg, salt 10 kg
- D. Charcoal 5 kg, salt 5 kg

Ans. C

Sol. The amount of charcoal and salt needed for GI pipe earthing are 10 Kg and 10 Kg respectively.

126. A 200 turn solenoid develops an average induced voltage of 50 V. Over what time interval must a flux change of 0.05 Wb occur to produce such a voltage?

- A. 0.2 S
- B. 2 S
- C. 0.5 S
- D. 0.1 S

Ans. A

Sol. $V = \frac{Nd\phi}{dt}$

$$50 = 200 \times \frac{0.05}{t}$$

$$\Rightarrow t = 0.2 \text{ sec}$$

127. An electron which is orbiting in second orbit of the atom. What will the equivalent energy of the electron in secondary stationary orbit?

- A. -6.8 eV
- B. -3.4 eV
- C. -13.6 eV
- D. -1.7 eV

Ans. B

Sol. Since we know that the total energy of electron in any stationary,

$$E_n = -\frac{13.6}{n^2} \text{ eV}$$

Where n is the number of the orbit = 2

$$\text{So } E_2 = -\frac{13.6}{2^2} \text{ eV} = -3.4 \text{ eV}$$

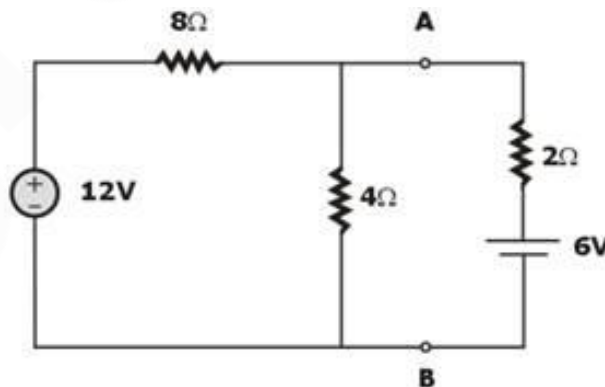
128. How many earth connections are required for the motor frame as per the IE rule 61?

- A. One
- B. Two separate and distinct
- C. Three separate and distinct
- D. None of these

Ans. B

Sol. Two separate and one distinct earth connection is required for the motor frame as per IE rule 61.

129. For the given circuit below calculate the V_{th} & R_{th} across the terminal A & B.



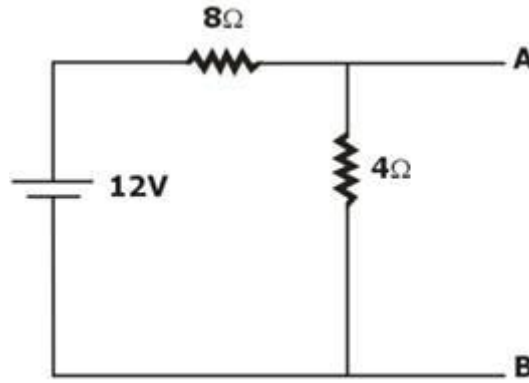
- A. $V_{th} = 6V ; R_{th} = 4\Omega$
- B. $V_{th} = 4V ; R_{th} = 2.67\Omega$
- C. $V_{th} = 6V ; R_{th} = 2.67\Omega$
- D. $V_{th} = 4V ; R_{th} = 4\Omega$

Ans. B

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Sol. To find V_{th} across A-B remove load resistant of 2Ω

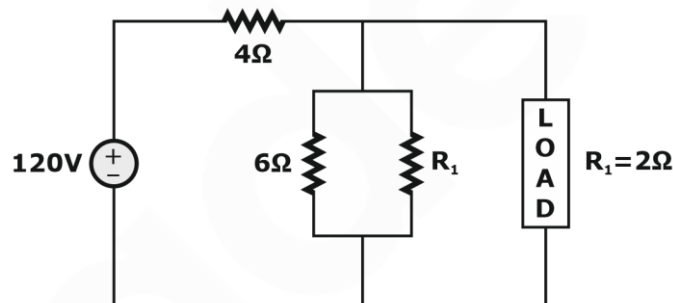


$$V_{AB} = \frac{12}{8+4} \times 4 = 4 \text{ Volt}$$

$$R_{th} = \frac{8 \times 4}{8+4} = \frac{32}{12} = 2.666\Omega$$

$$\approx 2.67\Omega$$

130. Find out the value of resistance R_1 , So that the maximum power transferred to load resistance of 2Ω .



A. $R = 4\Omega$

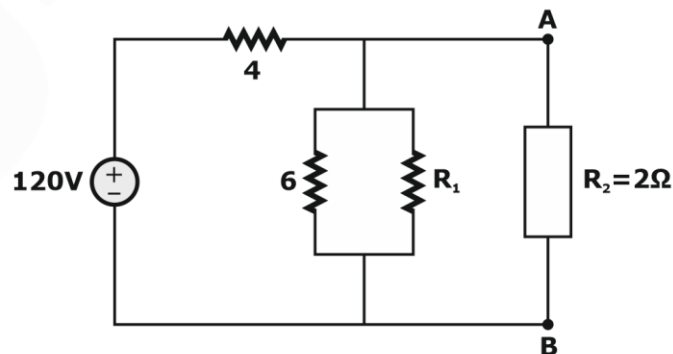
B. $R = 6\Omega$

C. $R = 8\Omega$

D. $R = 12\Omega$

Ans. D

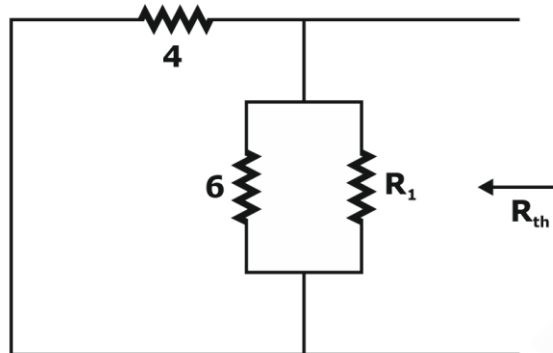
Sol.



Since we know that for maximum power trans for to load R_L , the Thevenin resistance AB by opening R_L & deactivating the source by its internal resistance must be equal to Load resistance.

i.e. $R_L = R_{th}$

So



$$R_{th} = 4 \parallel (6 \parallel R_1)$$

$$\text{or } R_{th} = 4 \parallel \left(\frac{6R_1}{R_1 + 6} \right)$$

$$\text{or } R_{th} = \frac{4 \times \left(\frac{6R_1}{R_1 + 6} \right)}{4 \times \frac{6R_1}{R_1 + 6}}$$

$$= \frac{24R_1}{4R_1 + 24 + 6R_1}$$

For maximum Power trans for $R_{th} = R_L = 2\Omega$

$$\text{i.e. } \frac{24R_1}{4R_1 + 24 + 6R_1} = 2$$

$$\Rightarrow 24R_1 = 8R_1 + 48 + 12R_1$$

$$4R_1 = 48 \Rightarrow R_1 = 12\Omega$$

131. A transformer is working at its full load and its efficiency is also maximum at which iron loss is 3.2 KW. Then, its copper loss at one-fourth of full load is

- A. 250 W
- B. 200 W
- C. 300 W
- D. 500 W

Ans. B

Sol. The iron loss at full load is 3.2 KW and maximum efficiency is obtained at full load.

$$P_{cuf1} = 3.2 \text{ KW}$$

$$\text{Copper losses at one-fourth of the full load} = \left(\frac{1}{4} \right)^2 P_{cuf1}$$

$$= \left(\frac{1}{4} \right)^2 \times 3.2 \times 1000 = 200\text{W}$$

132. When the 3-phase system is not grounded and if single line to ground fault occur the phase voltage of the other two healthy phase will
- A. It increases and becomes equal to the line voltage.
 - B. It increases and becomes 3 times the line voltage.
 - C. decreases and becomes $\frac{1}{\sqrt{2}}$ times the line voltage.
 - D. Remains unaffected

Ans. A

Sol. When the 3- ϕ system is not grounded and if single line to ground fault occurs than the phase of healthy phase will increases and becomes equal to the line voltage.

133. Which method is used for the lighting calculations?
- A. Watts per square meter method
 - B. Lumen or light flux method
 - C. Point to point method
 - D. All of these

Ans. D

Sol. The methods of calculating lighting are:

Watts per square meter method: Divide the wattage consumed in the room by its area in square feet to calculate watts per square foot. In our example, 650 watts divided by 192.89 square feet is 3.37 watts per square feet. This is principally a "rule of thumb" method, very handy for rough calculation or checking. It consists in making an allowance of watts per square metre of area to be illuminated according to the illumination desired on the assumption of an average figure of overall efficiency of the system.

Lumen or light flux method: Lumen method. In lighting design, the lumen method, (also called zonal cavity method), is a simplified method to calculate the light level in a room. The method is a series of calculations that uses horizontal illuminance criteria to establish a uniform luminaire layout in a space. This method is applicable to those cases where the sources of light are such as to produce an approximate uniform illumination over the working plane or where an average value is required. From the size of lamp or lamps employed and from their efficiency total lumens output are determined. Multiplying the total lumens output from the source by coefficient of utilization, the lumens received on the working plane are determined. If the lamps and surroundings are not perfectly clean, then in determination of lumens received on working plane, the depreciation factor or maintenance factor should be included, i.e.,

Lumens received on working plane

= (Number of lamps) \times (wattage of each lamp)

\times (efficiency of each lamp in terms of lumens/watt) \times $\left(\frac{\text{coefficient of utilization}}{\text{depreciation factor}} \right)$

Also, Lumens received on working plane = Number of lamps x wattage of each lamp x efficiency of each lamp in terms of lumens per watt x coefficient of utilization x maintenance factor.

Point to point method: This method is applicable where the illumination at a point due to one or more sources of light is required, the candle powers of the sources in the direction under consideration being known. If a polar curve of lamp and its reflector giving candle powers of the lamp in different directions is known, the illumination at any point within the range of the lamp can be calculated from the inverse square law. If two and more than two lamps are illuminating the same working plane, the illumination due to each can be calculated and added. This method is not much used because of its complicated and cumbersome applications. It is employed only in some special problems, such as flood lighting, yard lighting etc.

134. Two wave expressed as

$$X = 10 \sin (\omega t + 30^\circ)$$

$$Y = 20 \cos (\omega t)$$

A. Y is leading X by 60°

B. X is leading Y by 90°

C. Y is leading X by 30°

D. X and Y are in phase

Ans. A

Sol. $X = 10 \sin(\omega t + 30^\circ) = 10 \cos (\omega t + 30^\circ - 90^\circ) = 10 \angle -60^\circ$

$$Y = 20 \cos(\omega t)$$

Y is leading X by 60°

135. Phantom loading in an energy meter is used because

A. the arrangement gives accurate result.

B. the onside calibration is possible

C. power consumed in calibration work is minimized

D. None of these

Ans. C

Sol. The phantom loading in an energy meter is used to reduce the power consumption in its calibration work.

136. What should be the spacing between the two conductors if the working voltage is 11 kV?

A. 76 mm

B. 101 mm

C. 190 mm

D. 250 mm

Ans. B

Sol. The spacing between the two conductors if the working voltage is 11 KV is 101 mm.

137. What will be the utilization factor for an indirect lighting scheme?

A. 0.25 – 0.5

B. 0.5 – 0.75

C. 0.1 – 0.25

D. 0.75 – 0.99

Ans. C

Sol. The utilization factor for an indirect lighting scheme is 0.1 – 0.25. The utilization factor or use factor is the ratio of the time that a piece of equipment is in use to the total time that it could be in use. It is often averaged over time in the definition such that the ratio becomes the amount of energy used divided by the maximum possible to be used.

138. Advantage of using electron beam welding is/are

- A. Welds are clean
- B. Absence of porosity
- C. Distortion less
- D. All of these

Ans. D

Sol. The advantages of using electron beam welding are as follows:

1. Welds are clean
2. Absence of porosity
3. Distortion less

139. Ideal scheme of protection for over head transmission line is

- A. pilot wire protection
- B. differential protection
- C. distance protection
- D. time-graded over current protection

Ans. C

Sol. Both the time graded and pilot wire system are not suitable for the protection of very long high transmission line. They are too expensive.

The differential protection is used for the protection of stator winding fault of alternator.
The distance protection is used for the protection of transmission line

140. For improving the power factor of coreless type induction furnace,

- A. Capacitor is used
- B. Inductor is used
- C. Resistor is used
- D. Transistor is used

Ans. A

Sol. For improving the power factor of coreless type induction furnace, capacitor is used. The heart of the coreless induction furnace is the coil, which consists of a hollow section of heavy duty, high conductivity copper tubing which is wound into a helical coil. Coil shape is contained within a steel shell and magnetic shielding is used to prevent heating of the supporting shell.

141. A Zener diode operates as voltage regulator in which of the following biasing?

- A. Only forward biasing
- B. Only reverse biasing
- C. Either forward or reverse biasing
- D. Zero biasing

Ans. B

Sol. Zener diode is a highly doped p-n junction diode and as of normal diode, it works like a p-n junction diode in case of forward biasing but due to the heavily doped nature, in reverse biasing, the diode break downs and operates as a constant voltage source regulator.

142. In salt bath heating, the current can flow only through the

- A. Only through the salt bath
- B. Only through the material being heated
- C. Through both (a) and (b)
- D. None of these

Ans. A

Sol. In salt bath heating, the current can flow only through the salt bath.

Salt baths are used in a wide variety of heat treatment processes including neutral hardening, liquid carburising, liquid nitriding, austempering, martempering and tempering. Its Parts are loaded into a pot of molten salt where they are heated by conduction, giving a very readily available source of heat. The core temperature of a part rises in temperature at approximately the same rate as its surface in a salt bath.

Salt baths utilize a variety of salts for heat treatment, with cyanide salts being the most extensively used. Concerns about associated occupation health and safety, and expensive waste management and disposal due to their environmental effects has made the use of salt baths less attractive in recent years. Consequently, many salt baths are being replaced by more environmentally friendly fluidised bed furnaces.

143. Due to inductive effect of pressure coil the wattmeter.

- A. reads higher than the true value at low lagging p.f. and reads lower than the true value at low leading power factor.
- B. reads lower than the true value at low lagging p.f. and reads higher than the true value at low leading p.f.
- C. It will read same as true value at low power factor.
- D. None of these

Ans. A

Sol. Due to inductive effect of pressure coil of the wattmeter error is introduced at low power factor. It reads higher than the true value at low lagging p.f. and reads lower than the true value at low leading p.f.

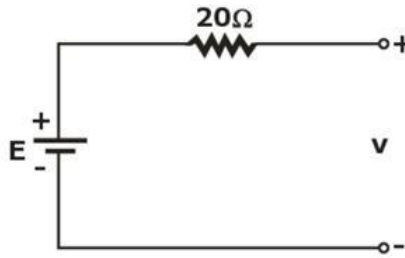
144. Which lamp is used in the outdoor illumination of buildings and airport runway?

- A. Halogen lamp
- B. Gaseous discharge lamp
- C. Sodium vapour lamp
- D. All of these

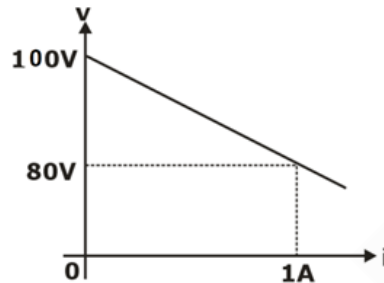
Ans. A

Sol. Halogen lamp is used in the outdoor illumination of buildings and airport runway.

149. Consider the circuit shown in figure below:



The voltage (v) vs current (i) curve of the circuit above is shown in figure below:

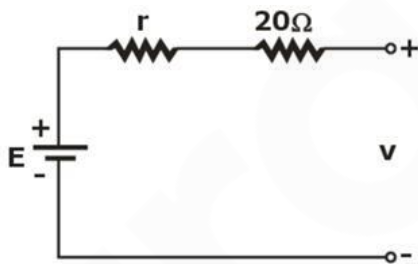


Then find the value of internal resistance of the source voltage "e" is

- A. 20 Ω
- B. 10 Ω
- C. 0 Ω
- D. 40 Ω

Ans. C

Sol.



Applying KVL in the loop:

$$E - i(20 + r) = V$$

At $I = 0$, $V = 100 \text{ V}$

Putting in the above equation, we get,

$$E = 100 \text{ V}$$

Then putting the value of $I = 1 \text{ A}$ and $V = 80 \text{ V}$ in the above same equation,

$$100 - 1(20 + r) = 80 \quad (20 + r) = 100 - 80 = 20$$

$$r = 0\Omega$$

150. The rate of heat produced by dielectric heating is increased by
- A. Increasing frequency and voltage supply
 - B. Increasing frequency and decreasing voltage supply
 - C. Decreasing frequency and voltage supply
 - D. Decreasing frequency and increasing voltage supply

Ans. A

Sol. The rate of heat produced by dielectric heating is increased by increasing frequency and decreasing voltage supply.

151. If the excitation of an alternator operating in parallel with other alternator is increased above the normal value of excitation, its
- A. Power factor becomes more leading
 - B. Power factor becomes more lagging
 - C. Output current decreases
 - D. Output KW decreases

Ans. B

Sol. According to the inverted V curve for alternator: An overexcited alternator operates at lagging power factor.

152. An ideal voltage source will charge an ideal capacitor
- A. In infinite time
 - B. Exponentially
 - C. Instantaneously
 - D. None of these

Ans. C

Sol. Since the voltage source is ideal, therefore its internal resistance is zero. Therefore, the time constant for the circuit becomes 0. Hence, the capacitor will charge and discharge instantaneously.

153. An ideal voltmeter has
- A. Zero internal resistance
 - B. Minimum internal resistance
 - C. Infinite internal resistance
 - D. Internal resistance is in mega ohm.

Ans. C

Sol. An ideal voltmeter has infinite internal resistance and an ideal ammeter has zero internal resistance.

154. In a potier triangle method for voltage regulation of synchronous machine, the height of the triangle gives-
- A. synchronous reactance drop
 - B. magnetizing reactance drop
 - C. leakage reactance drop
 - D. armature resistance drop

Ans. C

Sol. In a potier triangle method for voltage regulation of synchronous machine, the height of the triangle gives the leakage reactance drop.

155. In indirect core type of furnace, the element is heated by induction, which transfer the heat to the charge by

- A. Conduction
- B. Radiation
- C. Convection
- D. All of these

Ans. B

Sol. In indirect core type furnace, the element is heated by induction, and the heat is transferred to the charge by radiation. It is used for the same purpose as the resistance oven. Moreover, in the indirect induction heating method the eddy current is induced in the heating elements by electromagnetic induction which produces heat in heating elements.

156. Plug-setting multiplier is

- A. it is the ratio of pick up current to fault current in the relay coil
- B. It is the ratio fault current in relay coil to product of rated secondary current and current setting
- C. It is the ratio of current setting to product of fault current and rated secondary current of C.T
- D. It is the ratio of rated secondary current of C.T. to fault current in the relay coil

Ans. B

Sol. $PSM(\text{Plug Setting Multiplier}) = \frac{\text{Fault current in realy coil}}{\text{Pick up current}}$

Pick up current = rated secondary current of CT × current setting

$$PSM = \frac{\text{fault current in realy coil}}{\text{rated secondary current} \times \text{current setting}}$$

157. What should be the insulation resistance in case of PVC wires?

- A. 12.5 MΩ / number of outlets
- B. 82.5 MΩ / number of outlets
- C. 2.5 MΩ / number of outlets
- D. 10.5 MΩ / number of outlets

Ans. A

Sol. The insulation resistance for PVC wires should be 12.5 MΩ / number of outlets.

158. For welding aluminium alloys, the electrodes used are

- A. Hard drawn copper
- B. Cadmium copper
- C. Chromium copper
- D. Tungsten copper

Ans. A

Sol. For welding aluminium alloys, the electrodes used are hard drawn copper.

159. The heat required by the weld is produced due to the contact resistance between the two pieces and is
- A. Directly proportional to the current
 - B. Directly proportional to the square of the current
 - C. Inversely proportional to the square of the current
 - D. Inversely proportional to the current

Ans. B

Sol. The heat required by the weld is produced due to the contact resistance between the two pieces and is directly proportional to the square of the current.

160. An N-channel enhancement type MOSFET, which of the following statement is correct.
- A. In linear region it acts as a switch.
 - B. In triode region it acts as an amplifier.
 - C. In cut of region it acts as a resistor.
 - D. In saturation region it acts as an amplifier.

Ans. D

Sol. For an N-channel enhancement type MOSFET is generally used in three regions for different purposes as below:

- (i) In linear region as resistor.
- (ii) In triode region as a switch.
- (iii) In saturation region as an amplifier.

161. The synchronous speed of a three phase induction motor having 12 poles and connected to a 50 Hz source is
- A. 1000 rpm
 - B. 500 rpm
 - C. 3000 rpm
 - D. 1500 rpm

Ans. B

Sol. Synchronous speed is given by

$$N_s = \frac{120 f}{P}$$

$$N_s = \frac{120 \times 50}{12} = 500 \text{ rpm}$$

162. A voltage source having an open circuit voltage of 200 V and internal resistance of 25 Ω , is equivalent to the current source of
- A. 4 A in parallel with 25 Ω
 - B. 8 A in series with 25 Ω
 - C. 4 A in series with 25 Ω
 - D. 8 A in parallel with 25 Ω

Ans. D

Sol. $V_{OC} = 200V$

$R_{Th} = 25\Omega$

$$I_{SC} = \frac{V_{OC}}{R_{Th}} = \frac{200}{25} = 8A$$

$R_{SC} = 25\Omega$

163. A synchronous motor operates at 0.8 p.f. lagging. If the field current of the motor is continuously increased.

A. The armature current increases upto a certain value of field current and there after it decreases.

B. Armature current increases continuously.

C. Armature current decreases upto a certain value of field current and there after it increases.

D. Armature current decreases continuously

Ans. C

Sol. If the field current of a synchronous motor is continuously increased, then its power factor will gradually increase.

Therefore, motor will go through these following operating conditions with increasing field current.

Since, power factor is increased, current decreases.

When motor attains the unity power factor current is minimum. After this motor will operate in leading condition and then power factor decreases and hence current increases.

164. Reduction factor of a source of light is the ratio of its

A. Mean horizontal candle power to the mean spherical candle power

B. Mean spherical candle power to the mean horizontal candle power

C. Maximum horizontal candle power to the mean spherical candle power

D. Mean spherical horizontal candle power to the maximum spherical candle power

Ans. B

Sol. Reduction factor of a source of light is the ratio of its mean spherical candle power to the mean horizontal candle power.

165. The mutual inductance between two closely coupled coils is 1 H. If the turns of one coil is decreased to half and those of the other is doubled, the new value of the mutual inductance would be

A. 1/4 H

B. 1 H

C. 2 H

D. 1/2 H

Ans. B

Sol. $M = 1H$

$L \propto N^2$

$$M = K\sqrt{L_1 L_2}$$

$M_{new} = 1H$

166. A plant have the load factor of 0.7 and plant capacity factor 0.5. The maximum demand on the plant is 500 Mw. Find the reserve capacity of the plant?

- A. 100 MW
- B. 200 MW
- C. 300 MW
- D. 400 MW

Ans. B

Sol. Plant load factor = $\frac{\text{avg. load}}{\text{maximum demand}}$

Plant capacity factor = $\frac{\text{avg. load}}{\text{plant capacity}}$

Plant capacity = $\frac{\text{Maximum demand} \times \text{load factor}}{\text{capacity factor}}$

Plant capacity = $\frac{500 \times 0.7}{0.5} = 700 \text{ Mw}$

Reserve capacity = plant capacity - maximum demand
= 700 - 500 = 200 MW

167. For a BJT:

$I_C = 5\text{mA}$

$I_B = 50 \mu\text{A}$

$I_{CBO} = 0.5 \mu\text{A}$

Then the value of β is

- A. 98
- B. 97
- C. 96
- D. 99

Ans. D

Sol. $I_C = \beta I_B + I_{CBO}$

$\beta = \frac{I_C}{I_B + I_{CBO}} = \frac{5 \times 10^{-3}}{50.5 \times 10^{-5}} = 99$

168. What is the value of transconductance when the reverse gate voltage of JFET changes from 3 to 2.5 V and the drain current changes from 2 to 1.5 mA?

- A. 1 m Ω
- B. 2 m Ω
- C. 3 m Ω
- D. 4 m Ω

Ans. A

Sol. $\Delta V_{GS} = 3 - 2.5 = 0.5\text{V}$

$I_D = 2 - 1.5 = 0.5 \text{ mA}$

$g_m = \frac{\Delta V_{GS}}{I_D} = \frac{0.5\text{V}}{0.5\text{mA}} = 1\text{m}\Omega$

169. Two coils in differential connection have a self-inductance of 3 mH and 5 mH and the equivalent inductance of 7.7 mH then the value of mutual inductance.

- A. 1 mH
- B. 0.15 mH
- C. 0.3 mH
- D. 2 mH

Ans. B

Sol. $L_{eq} = L_1 + L_2 - 2M$

$$7.7 = 3 + 5 - 2M$$

$$\Rightarrow \frac{0.3}{2} = 0.15 \text{ mH}$$

170. Which of following statement is correct with respect to series R-L-C circuit at Resonance?

A. bandwidth is the ratio of quality factor to resonance frequency.

B. quality factor = $2\pi \times \left[\frac{\text{Peak energy stored in the circuit}}{\text{energy dissipated by circuit in one time period at resonance}} \right]$

C. At resonance circuit behaves as current rejector circuit

D. None of the above

Ans. B

Sol. Since

$$Q = \frac{W_o}{\text{bandwidth}}$$

$$\text{Bandwidth} = \frac{W_o}{Q}$$

Also

$$Q = 2\pi \times \left[\frac{\text{Peak energy store in the circuit}}{\text{energy dissipated by circuit in one time period at resonane}} \right]$$

and at resonance the impedance in the circuit is lowest. So the current is maximum in series R-L-C circuit at resonance.

So, it acts as current magnifier circuit

171. A starting torque of 50 N-m is developed in a three-phase induction motor by an auto transformer starter with a tapping of 40%. If the tapping of auto transformer starter is 60%, then starting torque will be _____.

A. 200 N-m

B. 25 N-m

C. 150 N-m

D. None of thes

Ans. D

Sol. For an auto transformer starting

$$T_s \propto x^2$$

Where x = tapping in autotransformer

$$\frac{T_{st1}}{T_{st2}} = \frac{x_1^2}{x_2^2}$$

$$T_{st2} = \left(\frac{x_2}{x_1} \right)^2 \times T_{st1}$$

$$T_{st2} = \left(\frac{0.6}{0.4} \right)^2 \times 50 = 112.5 \text{ N - m}$$

172. A 4 pole, three phase induction motor is running at 4 % slip at full load. The supply frequency is 50 Hz, then the frequency of the rotor is
- A. 2 Hz
 - B. 2.5 Hz
 - C. 20 Hz
 - D. 50 Hz

Ans. A

Sol. The relation between rotor frequency and stator frequency is

$$f_r = sf_s$$

$$f_r = 0.04 \times 50 = 2\text{Hz}$$

173. Doping of silicon with arsenic leads to
- A. Conductor
 - B. intrinsic semiconductor
 - C. P – type semiconductor
 - D. N - type semiconductor

Ans. D

Sol. Arsenic belongs to 5th group. Arsenic is called pentavalent impurity. When a pentavalent impurity is added to a pure semi-conductor it becomes N-type semi-conductor.

174. The rate of rise of restriking voltage depends on
- A. the type of circuit breaker
 - B. the inductance of the system only
 - C. the capacitance of the system only
 - D. both inductance and capacitance of the system

Ans. D

Sol. The rate of rise of restriking voltage depends on both inductance and capacitance of the system. The rate of rise of restriking voltage (RRRV) is defined as the slope of the steepest tangent to the restriking voltage curve or it is the slope of a line from voltage zero to the first peak of the wave. It is expressed in Volts/ps.

175. Nitrogen is added with the argon in an incandescent lamp to
- A. Reduce the temperature
 - B. Reduce the possibility of arcing
 - C. Increase the brightness
 - D. Increase the efficiency

Ans. B

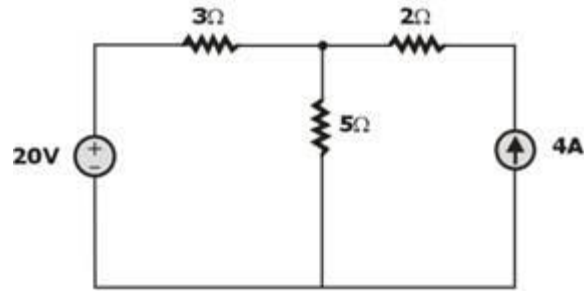
Sol. Nitrogen is added with the argon in an incandescent lamp to reduce the possibility of arcing.

176. What is the ratio of peak inverse voltage for mid-point and full wave bridge rectifier respectively?
- A. 2:1
 - B. 1:2
 - C. 1:1
 - D. None of these

Ans. A

Sol. The peak inverse voltage for mid-point (two diode rectifier) is $2V_m$ and the peak inverse voltage for full wave bridge rectifier is V_m .

177. Calculate the current flowing in 5Ω Resistor?

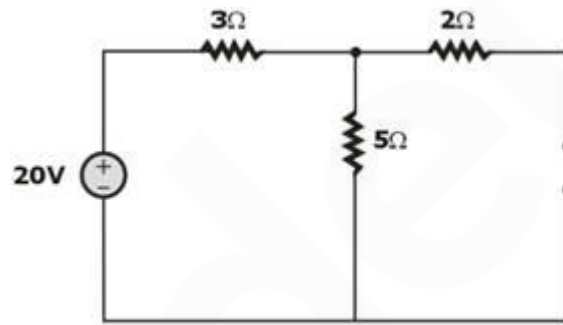


- A. 1 A
- B. 2 A
- C. 3 A
- D. 4 A

Ans. D

Sol. Applying super position theorem-

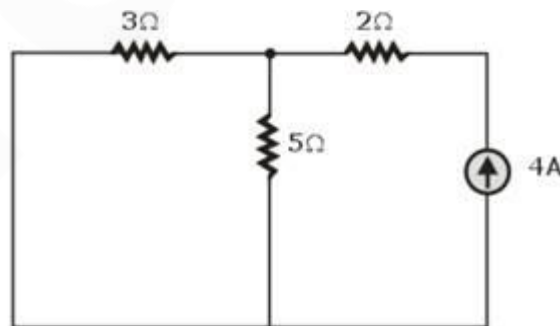
When 20V, voltage source done & current source deactivates.



$$I_{5\Omega} = \frac{20}{5+3} = 2.5A$$

When current source alone & voltage

Source is deactivated.



$$I'_{5\Omega} = \frac{4 \times 3}{3+5} = 1.5A$$

$$I_{\text{total}} = I_{5\Omega} + I'_{5\Omega}$$

$$= 2.5A + 1.5A = 4A$$

178. A resistor is connected across a 50 V source. The current in the resistor if the color code is red, Green, and orange, silver is?

- A. 21.4 mA
- B. 2 mA
- C. 2.2 mA
- D. 214 mA

Ans. B

Sol. $R = 25 \times 10^3 \pm 10\%$

$$I = \frac{V}{R} = \frac{50}{25 \times 10^3} = 2 \text{ mA}$$

179. The power of a 3- ϕ , 3 wire balanced system was measured by two-wattmeter method. The reading of one of the wattmeters was found to be thrice that of the other. What is the power factor of the system?

- A. 0.64
- B. 0.75
- C. 0.8
- D. 0.84

Ans. B

Sol. Given $W_1 = 3W_2$

$$\phi = \tan^{-1} = \left[\frac{\sqrt{3} [W_1 - W_2]}{W_1 + W_2} \right]$$

$$\phi = \tan^{-1} = \left[\frac{\sqrt{3} [3W_1 - W_2]}{3W_1 + W_2} \right]$$

$$\phi = \tan^{-1} = \left[\sqrt{3} \times \frac{2}{4} \right]$$

$$\phi = \tan^{-1} = \left[\frac{\sqrt{3}}{9} \right] = 40.86^\circ$$

$$\begin{aligned} \text{Power factor} &= \cos \phi = \cos (40.86^\circ) \\ &= 0.75 \end{aligned}$$

180. The input resistance of a FET is of the order of

- A. 100 Ω
- B. 10 k Ω
- C. 1 m Ω
- D. 100 M Ω

Ans. D

Sol. Input resistance of a FET is of the order of 100 M Ω .

181. What is resistance required to extend the 0-100 V range of 2000 Ω /V meter to 0-1000 V?

- A. series resistance value of 222.22 Ω
- B. series resistance value of 18 k Ω
- C. shunt resistance value of 18 k Ω
- D. shunt resistance value of 222.22 Ω

Ans. B

Sol. To extend the range of voltmeter the series resistance is required and the value of series resistance is

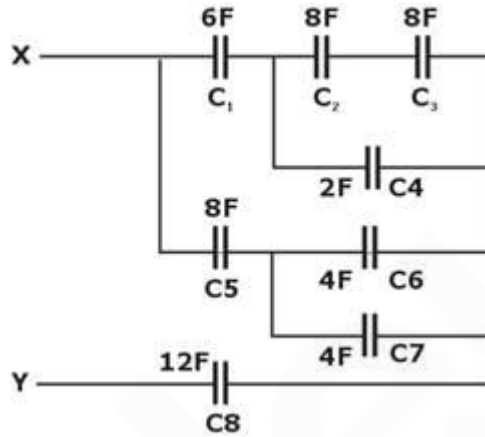
$$R_s = R_m (m-1)$$

$$m = \frac{V}{V_m} = \frac{1000}{100} = 10$$

$$R_s = 2000(10 - 1)$$

$$R_s = 18 \text{ k}\Omega$$

182. Calculate the equivalent capacitance between terminal X-Y.



A. $C_{XY} = 2.86 \text{ F}$

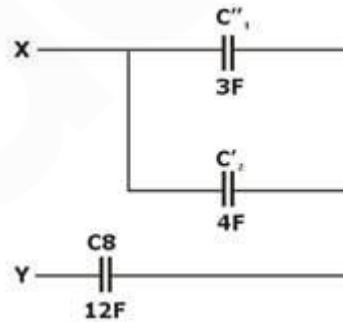
B. $C_{XY} = 3.12 \text{ F}$

C. $C_{XY} = 3.24 \text{ F}$

D. $C_{XY} = 4.42 \text{ F}$

Ans. D

Sol.



Equivalent capacitance C_2 in series with $C_3 = C_{23} = \frac{8 \times 8}{8 + 8} = 4\text{F}$

Then equivalent capacitance of $C_{23} || C_4$ let say $C'_1 = 2 + 4 = 6\text{f}$

Then equivalent capacitance between C_1 & C'_1 , let say $C''_1 = \frac{6 \times 6}{6 + 6} = 3\text{f}$

Equivalent capacitance of C_6 & C_7

$$C_{67} = 8\text{F}$$

∴ this equivalent capacitance is in series with 8F, so their equivalent let say C'_2

$$C_2' = \frac{8 \times 8}{8 + 8} = 4f$$

Resultant circuit

$$C_{XY} = (C_1' \parallel C_2') = 3 + 4 = 7f$$

Therefore $C_{XY} \Rightarrow$

$$\text{So } C_{XY} = \frac{7 \times 12}{7 + 12} = 4.42f$$

183. The inside wall of fluorescent tube is coated with

- A. Sulphur powder
- B. Phosphor powder
- C. Sodium
- D. Krypton

Ans. B

Sol. The inside wall of fluorescent tube is coated with phosphor power.

184. The efficiency of a DC shunt generator is maximum when

- A. stray load loss equals to mechanical loss
- B. field ohmic loss equals to the constant loss
- C. iron loss equals to the copper loss
- D. armature circuit loss is equals to the sum of no-load rotational loss and field circuit loss

Ans. D

Sol. For maximum efficiency of a DC shunt motor

Variable loss = constant loss

In the variable loss only armature circuit is considered.

In the constant loss = iron loss + rotational loss + field circuit loss

In the transformer, there are not rotating part so No rotational loss, so in the transformer for maximum efficiency occurs when

Iron loss = copper loss

But in case of D.C. shunt generator condition for maximum efficiency is slightly different due to rotational losses.

185. If the length of the arc in a circuit breaker increases, its resistance

- A. decreases
- B. increases
- C. remains same
- D. none of the above

Ans. B

Sol. 1. If the length of the arc or the separation of the contactors in a circuit breaker increases, its resistance increases. If the contact separation is large, then arc extinction is less.

2. The arc resistance increases with increase in dielectric strength of the medium.

3. With the decrease in number of particles to be ionized, the arc resistance will increase.

4. The arc resistance increases with decrease in area of cross section of the arc.

186. Non - consumable electrodes are made of
- A. Carbon
 - B. Graphite
 - C. Either carbon or graphite
 - D. Same material as the metal pieces to be welded

Ans. C

Sol. Non-consumable electrodes are made of either carbon or graphite.

187. What is the normal life of a fluorescent lamp?
- A. 2000 hours
 - B. 3500 hours
 - C. 7500 hours
 - D. 10000 hours

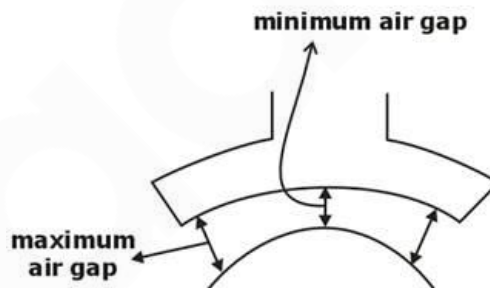
Ans. C

Sol. The normal life of a fluorescent lamp is 7500 hours.

188. In salient-pole machines, the air-gap length under the poles is not kept constant so as to
- A. obtain as sinusoidal distribution of armature flux
 - B. Minimize the effect of armature mmf on the main field flux
 - C. to increase the excitation
 - D. obtain a sinusoidal distribution of main field flux.

Ans. D

Sol. To make the main field flux distribution sinusoidal under the poles, the air-gap length is not kept constant.



The minimum air gap at the pole centre and maximum air gap at the corner of poles.

189. According to second law of illumination, the illumination at any point on an inclined surface is
- A. Directly proportional to the cosine of the angle between the normal to the surface at that point
 - B. Directly proportional to the sin of the angle between the normal to the surface at that point
 - C. Directly proportional to the tan of the angle between the normal to the surface at that point
 - D. Directly proportional to the cotangent of the angle between the normal to the surface at that point

Ans. A

Sol. According to second law of illumination, the illumination at any point on an inclined surface is directly proportional to the cosine of the angle between the normal to the surface at that point.

190. Which of the following has the least number of free electrons in it?

- A. Superconductors
- B. Semiconductors
- C. Conductors
- D. Insulators

Ans. D

Sol. Conductivity of any material depends on the number of free electrons present in it. Higher the number of free electrons, higher the conductivity of the material and vice-versa. Therefore, insulator shows the least conductivity, hence it has least number of free electrons among all other materials.

191. In a BJT if $\beta = 150$ & collector current $I_C = 1.2$ mA. The transistor is used as for the purpose of amplification. Calculate base current I_B .

- A. 4 mA
- B. 6 μ A
- C. 8 μ A
- D. 12 μ A

Ans. C

Sol. For a BJT the relation b/w I_C & I_B in active region-

$$I_C = \beta I_B$$

$$\text{So } I_B = \frac{1.2 \text{ mA}}{150} = \frac{1.2}{150} \times 10^{-3} \text{ A}$$

$$= .008 \times 10^{-3} \text{ A}$$

$$= 8 \times 10^{-6} \text{ A}$$

$$= 8 \mu \text{ A}$$

192. Which among these tests are to be conducted on wiring installations?

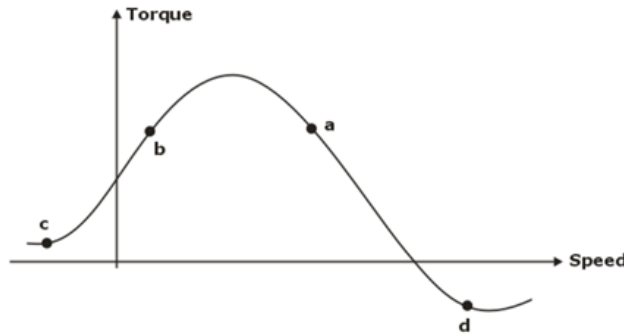
- A. Testing of polarity of on linked single pole switches
- B. Testing of earth continuity path
- C. Testing of earth resistance
- D. All of these

Ans. D

Sol. The tests conducted on wiring installations are as follows:

1. Testing of polarity of on linked single pole switches
2. Testing of earth continuity path
3. Testing of earth resistance

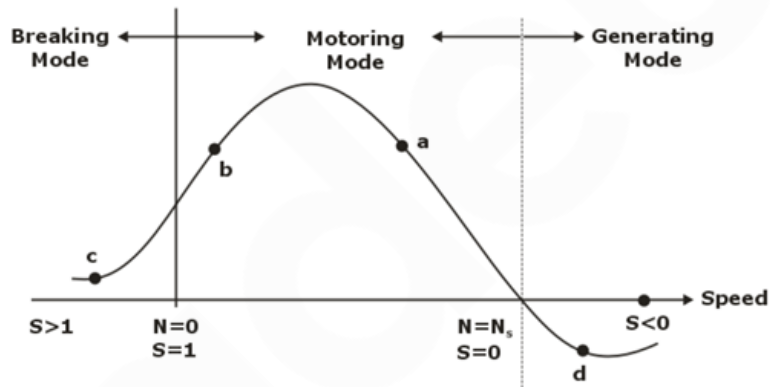
193. Which of points on the torque speed curve of the induction motor represents operation at slip less than zero.



- A. a
- B. b
- C. c
- D. d

Ans. D

Sol. Torque speed characteristics of an Induction Motor is



194. In an ac circuit, $V = (200 + j 40) \text{ V}$ and $I = (30 - j 10) \text{ A}$.

The active and reactive power of the circuit are respectively

- A. 6400 W, 800 VAR capacitive
- B. 6400 W, 800 VAR inductive
- C. 5600 W, 3200 VAR capacitive
- D. 5600 W, 32000 VAR inductive

Ans. A

Sol. $V = (200 + j 40) \text{ V}$

$I = (30 - j 10) \text{ A}$

Complex power, $S = VI^* = (200 + j 40)(30 - j 10) = 6000 - j 2000 + j 1200 + 400 = 6400 - j 800$

Thus, active power, $P = 6400 \text{ W}$, $Q = 800 \text{ VAR}$ (capacitive)

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195. Mutual inductance between two coils is 5 H. If current in one coil changes at the rate of 2 A/sec, then the emf induced in the other coil is

- A. 10 V
- B. 8 V
- C. 2.5 V
- D. 5 V

Ans. A

Sol. Emf induced due to mutual inductances only is

$$|e| = \frac{M di}{dt} = 5 \times 2 = 10V$$

196. In inert gas metal arc welding,

- A. Argon is used for welding thin materials and helium is used for welding thick materials
- B. Both argon and helium are used for welding thin materials
- C. Both argon and helium are used for welding thick materials
- D. Argon is used for welding thick materials and helium is used for welding thin materials

Ans. A

Sol. In inert gas metal arc welding, argon is used for welding thin materials and helium is used for welding thick materials.

197. Which of the following circuit parameter act as short circuit at low frequency measurement and open circuited at high frequency?

- A. Inductor
- B. Capacitor
- C. Resistor
- D. None of these

Ans. A

Sol. $\omega \rightarrow 0 \Rightarrow X_L = 0$

$$\omega \rightarrow \infty \Rightarrow X_L = \infty$$

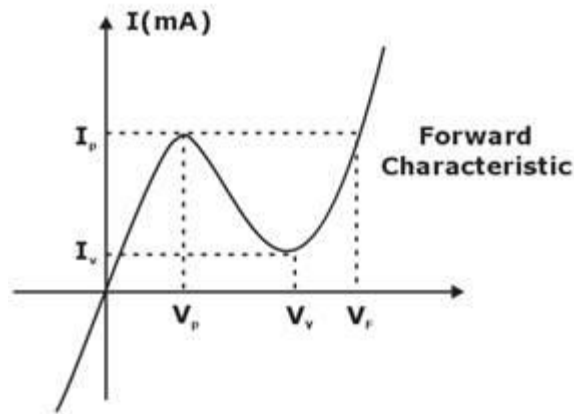
198. Among the following characteristic, which statement is incorrect for the tunnel diode.

- A. It has large forward voltage drop
- B. dynamic conductance is negative
- C. excellent conductor in reverse direction
- D. Thickness of the Barrier is very small

Ans. A

Sol. When the concentration of impurity is increased to 1 part in 10^3 , the characteristic of p-n junction diode changes significantly & this p-n junction diode is called tunnel diode.

Characteristic of Tunnel diode:



1. Impurity concentration is high.
2. Depletion width $\approx 100 \text{ \AA}$
3. Barrier thickness very small
4. Excellent conductor in Reverse direction
5. Thickness of Barrier is about 1/5 of visible light

199. The regulation of an alternator supplying resistive or inductive load is

- | | |
|--------------------|--------------------|
| A. Always negative | B. Always positive |
| C. Infinity | D. Zero |

Ans. B

Sol. The voltage regulation of an alternator supplying resistive or inductive load is always positive and for capacitive load, it's always negative.

200. An electric heater draws 1000 watts from a 250 V source. The power drawn from a 200 V source is

- | | |
|-----------|-------------|
| A. 800 W | B. 640 W |
| C. 1000 W | D. 1562.5 W |

Ans. B

Sol. $P = \frac{V^2}{R}$

$$\frac{P_1}{P_2} = \frac{V_1^2}{V_2^2}$$

$$\frac{1000}{P} = \left(\frac{250}{200}\right)^2$$

$$P = \frac{1000}{25} \times 16$$

$$P = 640 \text{ W}$$

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