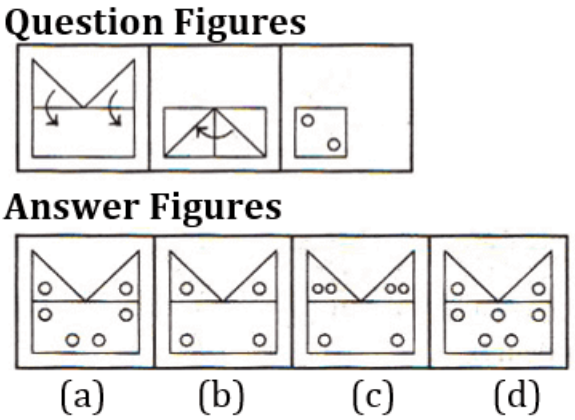
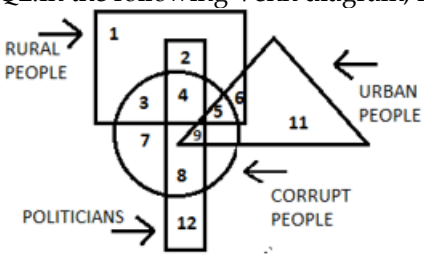
Q1.A piece of paper is folded and punched as shown below. From the given responses indicate how it will appear when opened.




A. A
B. B
C. C
D. D
**Ans**
(A)

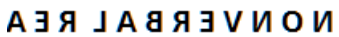
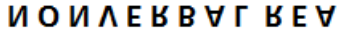
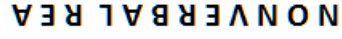
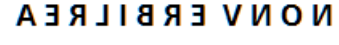
Q2.In the following Venn diagram, identify the Politicians from Urban Areas who are Corrupt.




A. 4
B. 5
C. 9
D. 6
**Ans**
(C)

Q3.Choose the alternative which is closely resembles the mirror image of the given combination.

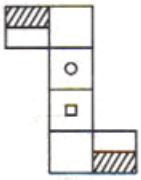
NONVERBAL REA

A. 
B. 
C. 
D. 

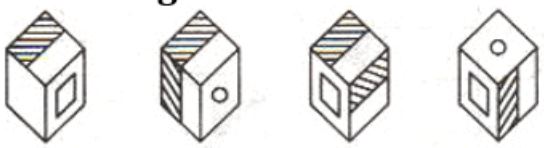
**Ans**
(A)

Q4.Choose from the four answer figures that will be formed when the question figure is folded into a box?

**Question figure**



**Answer figures**



(a) (b) (c) (d)

A. A
B. B
C. C
D. D
**Ans**
(D)

Q5.In the following question given below are two matrices of twenty five cells each containing two classes of letters from the alphabet. The columns and rows of matrix I are numbered from 0 to 4 and that of matrix II from 5 to 9. A letter from these matrices can be represented first by its row number and next by its column number. For example, F can be represented by 00, 24. Similarly, identify one set of number pairs out of (A), (B), (C), (D) which represents the given word.

**MATRIX I**

| | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| 0 | F | G | H | O | M |
| 1 | O | M | F | G | H |
| 2 | G | H | O | M | F |
| 3 | G | H | O | M | F |
| 4 | M | F | G | H | O |

**MATRIX II**

| | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|
| 5 | S | T | U | V | W |
| 6 | U | V | W | S | T |
| 7 | W | S | T | U | V |
| 8 | T | U | V | W | S |
| 9 | V | W | S | T | U |

SOFT
A. 55, 03, 22, 77
B. 89, 32, 12, 97
C. 68, 11, 12, 98
D. 89, 03, 12, 98
**Ans**
(D)

Q6.In each of the following questions, select the one which is different from the other three responses.
A. Happiness
B. Honesty
C. Deceive
D. Truth
**Ans**
(C)
**Solution:**
All are positive virtue of human except deceive.

Q7.In each of the following questions, select the one which is different from the other three responses.
A. EPH
B. FQI
C. HSK
D. KWO
**Ans**
(D)
**Solution:**

sequence is +11 , +8 in all except d

Q8.In each of the following questions, select the one which is different from the other three responses.
A. ECDBA
B. OMNLK
C. WUVTS
D. SRTQP
**Ans**
**(D)**
**Solution:**
the sequence is ABCDE-ECDBA followed, except SRTQP

Q9.In each of the following questions, select the one which is different from the other three responses.
A. 65
B. 85
C. 35
D. 25
**Ans**
**(D)**
**Solution:**
Other numbers are not finite square except 25

Q10.In each of the following questions, select the one which is different from the other three responses.
A. 10-60
B. 30-90
C. 40-240
D. 20-120
**Ans**
**(B)**
**Solution:**
10*6 =60 , 20*6=120 ,40*6=240 but 30*3 = 90

Q11.In each of the following questions, select the one which is different from the other three responses.
A. CFD
B. GJH
C. KNM
D. JMK
**Ans**
**(C)**
**Solution:**
Only KNM having different gapping formate.

Q12.In each of the following questions, select the one which is different from the other three responses.
A. Genius
B. Character
C. Charm
D. Clever
**Ans**
**(B)**
**Solution:**
all are qualities of human kind

Q13.In each of the following questions, select the one which is different from the other three responses.
A. Chennai
B. Aizwal
C. Goa
D. Jaipur
**Ans**
**(C)**
**Solution:**
all other are capital while goa is state

Q14.In each of the following questions, select the one which is different from the other three responses.
A. 572
B. 963
C. 532
D. 761
**Ans**
**(A)**
**Solution:**
First digit is sum of other two . 9=6+3 , 5=3+2 but 572 is different

Q15.From amongst the given alternatives, select the one in which the set of numbers is most like the set of numbers given below:
(10, 12, 15)
A. 21, 23,27
B. 30,32,36
C. 60, 62, 66
D. 68, 70, 73
**Ans**
**(D)**
**Solution:**
same difference

Q16.A series is given with one term missing. Choose the correct alternative from the given ones that will complete the series.
1763, 1992, 2221, ? ,2679, 2908
A. 2474
B. 2512
C. 2314
D. 2450
**Ans**
**(D)**
**Solution:**
same difference of 229

Q17.A series is given with one term missing. Choose the correct alternative from the given ones that will complete the series.
A, G, L, P, ?, U, V
A. R
B. S
C. Q
D. T
**Ans**
**(B)**
**Solution:**
sequence is +6, +5,+4,+3

Q18.A series is given with one term missing. Choose the correct alternative from the given ones that will complete the series.
AZ, CX, ET, GN, ?
A. MG
B. JC
C. IF
D. LE
**Ans**
**(C)**
**Solution:**
the letter related with that sequence A-C-E-G-I, And Z-X-T-N-F.

Q19.A series is given with one term missing. Choose the correct alternative from the given ones that will complete the series.
29, 40, 44, 52, 59, ?
A. 73

B. 66
C. 67
D. 74
**Ans**
**(A)**
**Solution:**
29 + 11(2+9)=40 , 40 + 4 (4+0)=44 , 44+8(4+4) =52 , 52 + 7(5+2)=59 ,similarly 59 + 14(5+9)=73

Q20.A series is given with one term missing. Choose the correct alternative from the given ones that will complete the series.
3,7, 15, 31, 63, ?
A. 92
B. 115
C. 127
D. 131
**Ans**
**(C)**
**Solution:**
3*2+1=7 , 7*2=15 ,15*2+1=31,31*2+1=63, 63*2+1=127

Q21.Which one set letters when sequentially placed at the gaps in the given letter series shall complete it?
h_eg__fegh_eghfe_
A. gffh
B. hhgg
C. ffgh
D. fhfg
**Ans**
**(D)**
**Solution:**
hfeg/hfeg/hfeg

Q22.Which one set letters when sequentially placed at the gaps in the given letter series shall complete it?
_011121_11121_111_
A. 1002
B. 1102
C. 1012
D. 1211
**Ans**
**(A)**
**Solution:**
101112/101112/101112

Q23.Which one set letters when sequentially placed at the gaps in the given letter series shall complete it?
ab_abb_a_b_abb_a
A. ccccc
B. ccbcc
C. cbcbc
D. bcccb
**Ans**
**(B)**
**Solution:**
abcabbcabbbcabb

Q24.In a row of fourty children, P is twenty third from the left end and Q is twenty seven from the right end. How many children are there between P and R, if R is fourth from the left of Q?
A. 12
B. 13
C. 14
D. 15
**Ans**
**(A)**
**Solution:**

the position of R from right is 31st and from right (40 – 31-1) 10th . P is at 23rd position from right. Children between P and R = 23-10-1 = 12

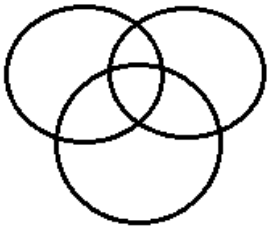
Q25.E is the sister of B. A is the father of C. B is the son of C. How is A related to E?
A. Grandfather
B. Granddaughter
C. Father
D. Great-Grandfather
**Ans**
**(A)**
**Solution:**
A is grand father of E.

Q26.Four diagrams are given for given question. Choose the best diagram that describes
Lemon, Citrus Fruits, Chocolates

A. 

B. 

C. 

D. 

**Ans**
**(C)**

Q27.Select the missing number from the given responses:

| | | |
|---|---|---|
| 2 | 4 | 0 |
| 1 | 2 | 4 |
| 3 | 1 | 3 |
| 36 | ? | 91 |

A. 70
B. 73
C. 77
D. 63
**Ans**
**(B)**
**Solution:**
the number in fourth row is equal to the sum of the cubes of the numbers in the above rows.

Q28.Select the missing number from the given responses:

A. 245
B. 265
C. 255
D. 275
**Ans**
(C)
**Solution:**
next term is the 2 multiple of the previous one +1

Q29.In the following questions, some statements are given , followed by two/three conclusion I ,II ,III. You have to consider the statements to be true, even if they seem to be at variance from commonly known facts. You have to decide which of the given statements is/are correct. Indicate your answer.
Statements :
I. Some doors are water
II. All waters are jugs.
III. No jugs are window.
Conclusions :
I. Some jugs are water
II. No water is jug.
III. Some doors are Jug
A. Only I and II follows
B. Only I follows
C. Only I and III follows
D. All follows
**Ans**
(C)
**Solution:**
Only I and II conclusions follow.

Q30.In the following questions, some statements are given , followed by two/three conclusion I ,II ,III. You have to consider the statements to be true, even if they seem to be at variance from commonly known facts. You have to decide which of the given statements is/are correct. Indicate your answer.
Statements :
I. Some scales are pencils.
II. Some erasers are pencils.
Conclusions :
I. Some pencils are erasers.
II. Some pencils are scales.
A. Only I follows.
B. Only II follows.
C. Both I and II follow
D. Neither I nor II follows
**Ans**
(C)
**Solution:**
Both I and II follows

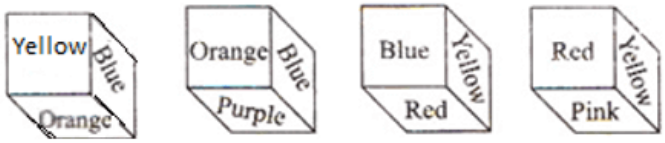
Q31.What should come next in the following letter series?
A Z A B Y A B C X A B C D W A B C D E V A B C D
A. F
B. E
C. Z
D. A
**Ans**
(B)
**Solution:**
Character E will be the next letter.

Q32.Which of the following element is 7th to the right of 15th element from the right ?
A8B6#7HU%3$FVR21@41WE9*L5

A. 4
B. $

C. 1
D. W
**Ans**
**(A)**
**Solution:**
15-7 =8 letter from the right.

Q33.Which of the following will the opposite of Purple?




A. Yellow
B. Red
C. Blue
D. Orange
**Ans**
**(A)**
**Solution:**
Blue and Orange is the adjacent of purple and yellow.

Q34.Arrange the following words as per order in the dictionary
1. Competition
2. Countryside
1. 3. Convention
4. Curriculum
5. Culmination
A. 1,2,3,4,5
B. 1,3,2,5,4
C. 1,3,4,5,2
D. 4,5,3,2,1
**Ans**
**(B)**
**Solution:**
Sequence 1,3,2,5,4.

Q35.In a certain code DESPAIR is written as TFEQSJB. How is NUMERAL written in that code?
A. OVNFMBS
B. NVOFSBN
C. NVOMFBS
D. NVOFMBS
**Ans**
**(D)**
**Solution:**
first and last three terms are reversed with +1 ; the middle term exceeds by one.

Q36.In a certain code 'MONKEY' is written as 'XDJMNL'. How is TIGER written in that code?
A. SHFDQ
B. QDFHS
C. SDFHS
D. QDHJS
**Ans**
**(B)**
**Solution:**
the terms are reversed with -1.

Q37.In a certain language code
(i) 'lee ra de' means 'What was it'
(ii) 'mo nil' means 'You go'
(iii) 'nil pom ra' means 'You like it'
(iv) 'tok lee to' means ''She was sick'

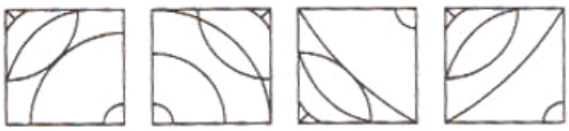
How is ‘What you like’ written in that code?
A. pom nil ra
B. pom ra lee
C. nil re lee
D. None of these
**Ans**
**(D)**
**Solution:**
from eq (ii) and (iii), ‘you’ means ‘nil’; from eq (iii) means ‘pom’; from eq (i) means ‘de’

Q38.Which of the following word can’t be made from word ‘PHARMACEUTICAL’
A. RHEUMATIC
B. CRITICAL
C. PRACTICE
D. METRIC
**Ans**
**(B)**
**Solution:**
CRITICAL

Q39.Arrange these words in a meaningful order
1. Plot
2. Planning
3. Rent
4. Money
5. Building
A. 23514
B. 41253
C. 12354
D. 34251
**Ans**
**(B)**
**Solution:**
The Sequence is 4,1,2,5,3.

Q40.Find the missing figure of the series from the given answer figures.
Question Figure

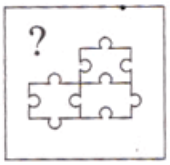

Answer Figures



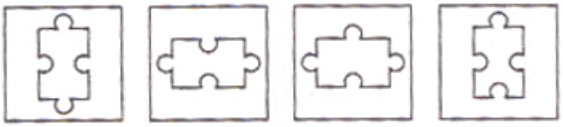

A. A
B. B
C. C
D. D
**Ans**
**(A)**

Q41.Find the missing figure of the series from the given answer figures.

Question Figure




Answer figures

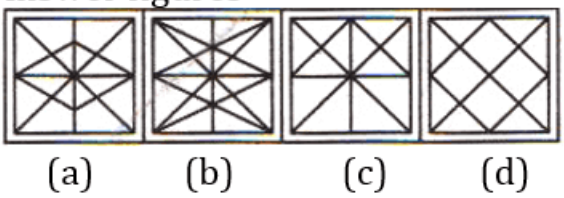



A. A
B. B
C. C
D. D
**Ans**
**(B)**

Q42.In which answer figure is the question figure embedded?

Question Answer

Answer figures




A. A
B. B
C. C
D. D
**Ans**
**(B)**

Q43.In each of the following questions, select the related letters/words/number from the given alternatives.
20 : 50 :100 : ?
A. 150
B. 250
C. 200
D. 156
**Ans**
**(B)**
**Solution:**
multiply by 2.5

Q44.In each of the following questions, select the related letters/words/number from the given alternatives.
Gulp: Drink:: Rush: ?
A. Hop
B. Walk
C. Run
D. Jump
**Ans**
**(B)**
**Solution:**

gulp means to drink fast, similarly rush means to walk fast

Q45.In each of the following questions, select the related letters/words/number from the given alternatives.
ABCD: ZYXW: : EFGH : ?
A. EUTS
B. POTS
C. UOTS
D. VUTS
**Ans**
**(D)**
**Solution:**
counting the alphabets from last to first

Q46.In each of the following questions, select the related letters/words/number from the given alternatives.
Affluent : Opulent : : Flourish : ?
A. Flatter
B. Comprise
C. Outflow
D. Prosper
**Ans**
**(D)**
**Solution:**
synonyms

Q47.In each of the following questions, select the related letters/words/number from the given alternatives.
3 : 10 :: 08 : ?
A. 25
B. 14
C. 20
D. 13
**Ans**
**(A)**
**Solution:**
3*3 + 1, similarly 8*3 +1 = 25

Q48.In each of the following questions, select the related letters/words/number from the given alternatives.
? : 233345 : : 51119 : 91523
A. 203042
B. 192840
C. 182840
D. 192941
**Ans**
**(D)**
**Solution:**
difference is same

Q49.In each of the following questions, select the related letters/words/number from the given alternatives.
Newspaper : Reader :: Bread : ?
A. Wheat
B. Buyer
C. Consumer
D. Baker
**Ans**
**(C)**
**Solution:**
newspaper is finally reached to its reader similarly bread is finaly used by consumer

Q50.Village B, is situated to the north of A. Village C is situated in east of village B. Village D is left of Village A . Then village C is situated in which direction of village D?
A. West
B. North- East
C. South

D. South – East
**Ans**
**(D)**
**Solution:**
C is in North East direction of D.

Q51.The main reason for the execution of Guru Arjun Singh was that –
A. he was conspiring against Mughals
B. he refused to embrace Islam
C. he had blessed Prince Khusro who had revolted against Jahangir
D. Jahangir did not like him
**Ans**
**(C)**

Q52.Right to vote/ adult franchise is –
A. A fundamental Right
B. A legal Right
C. A human Right
D. None of the above
**Ans**
**(B)**

Q53.Which is the intersecting hormone to stimulate thyroid gland to secrete thyroxin ?
A. TSH
B. FSH
C. LTH
D. ACTH
**Ans**
**(A)**

Q54.Chandragupta II got the title of 'Vikramaditya'. The meaning of 'Vikramaditya' is equal to –
A. Sun God
B. Agni
C. Vayu
D. Indra
**Ans**
**(A)**

Q55.Which country is geographically in North America but politically a part of Europe ?
A. Canary Islands
B. Iceland
C. Greenland
D. Cuba
**Ans**
**(C)**

Q56.'Willow' for a cricket bat is obtained from –
A. Tropical forest
B. Rain forests
C. Deciduous forests
D. Coniferous forests
**Ans**
**(C)**

Q57.Who defined 'Rent' as that portion or produce of the earth which is paid to the landlord for the use of original and indestructible power of the soil ?
A. Ricardo
B. Marshall
C. Keynes
D. Pigou
**Ans**
**(A)**

Q58."Linkage" was discovered by –
A. Blakslee
B. Morgan
C. Muller
D. Bateson
**Ans**
**(D)**

Q59.Which of the following cities is the capital of the desert country Mali ?
A. Damascus
B. Bamako
C. Adra
D. Ankara
**Ans**
**(B)**

Q60.Public Works Department (P.W.D.) as a separate department was set up by –
A. Dalhousie
B. Canning
C. Auckland
D. Wellesley
**Ans**
**(A)**

Q61.The slogan of 'Poverty abolition' was given in which Five Year Plan ?
A. Second Plan
B. Fourth Plan
C. Fifth Plan
D. Sixth Plan
**Ans**
**(C)**

Q62.Bijapur is known for its –
A. Severe drought condition
B. Gol Gumbaz
C. Heavy rainfall
D. Statue of Gomateswara
**Ans**
**(B)**

Q63.Which one of the following is not a Directive Principle of State Policy ?
A. Prohibition of the consumption of intoxicating drinks.
B. Prohibiting the slaughter of cows and calves.
C. Protection and improvement of environment.
D. Free education for the children up to age of 16 years.
**Ans**
**(D)**

Q64.The State having the highest rainfall by North East Monsoon is –
A. Assam
B. West Bengal
C. Tamil Nadu
D. Orissa
**Ans**
**(C)**

Q65."A person can move to the Supreme Court by appropriate proceedings for the enforcement of the Fundamental Rights if violated." This is a provision in –
A. Right to Equality
B. Right to Constitutional Remedies
C. Right against Exploitation

D. Right to Religious Freedom
**Ans**
**(B)**

Q66.The Montreal Protocol on substances that depletes the Ozone layer in 1987 was established under the auspices of –
A. UNEP
B. APFO
C. IPCC
D. FAO
**Ans**
**(A)**

Q67.Which of the following days is observed as "World Ozone Day" ?
A. 16 September
B. 16 October
C. 10 August
D. 19 January
**Ans**
**(A)**

Q68.Which of the following phenomena is associated with global warming ?
A. La Nino
B. Nino Modoki
C. Southern Oscillation
D. El Nino
**Ans**
**(B)**

Q69.Arrange the following events in chronological order and choose the correct answer using the codes given below –

A. Amritsar Incident
B. Chauri Chaura Incident
C. Champaran Movement
D. Mopla Revolt
A. A, B, C, D
B. B, A, C, D
C. C, A, D, B
D. C, A, B, D
**Ans**
**(C)**

Q70.Which of the following countries contributes the maximum to the world's diamond supply ?
A. Japan
B. South Africa
C. Russia
D. U.S.A.
**Ans**
**(C)**

Q71.The Foreign Exchange Management Act was adopted by the parliament in –
A. 1996
B. 1997
C. 1998
D. 1999
**Ans**
**(D)**

Q72.Which medieval Indian ruler started the system of "Patta" and "Qabuliyat" ?
A. Alauddin Khalji
B. Mohammad Bin Taughlaq
C. Sher Shah

D. Akbar
**Ans**
**(C)**

Q73.The recommendations of the Sarkaria Commission relate to –
A. Distribution of revenue
B. Powers and functions of President
C. Membership of the Parliament
D. Centre-State relations
**Ans**
**(D)**

Q74.Which one of the following languages is not specificed in Schedule 8 of the Indian Constitution ?
A. Sanskrit
B. Sindhi
C. English
D. Nepali
**Ans**
**(D)**

Q75.Sporangia bearing leaf of a fern is called as –
A. Ramentum
B. Indusium
C. Sorus
D. Sporophyll
**Ans**
**(D)**

Q76.World's largest producer coffee ?
A. India
B. Argentina
C. Brazil
D. Peru
**Ans**
**(C)**

Q77.Pick out the person associated with the coining of the term 'gene' —
A. Mendel
B. Morgan
C. Waldeyer
D. Johannsen
**Ans**
**(D)**

Q78.Who was Akbar's famous revenue minister ?
A. Todarmal
B. Humayun
C. Tansen
D. Rana Pratap Singh
**Ans**
**(A)**

Q79.In which year was the first world environment day observed ?
A. 1972
B. 1973
C. 1980
D. 1974
**Ans**
**(A)**

Q80.The total utility from 9 units of commodity x is 20 and from 10 units is 15. Calculate the marginal utility from 10th unit.

A. – 0.5
B. 5
C. – 5
D. 0.5
**Ans**
**(C)**

Q81.The battle of Plassey was fought between :
A. Mir Qasim and Robert Clive.
B. Siraj-ud-daula and Robert Clive.
C. None of the options.
D. Mir Jafar and Robert Clive.
**Ans**
**(B)**

Q82.National Renewal Fund (NRF) was instituted for the purpose of –
A. Providing pension for retiring employees.
B. Restructuring and modernization of industries.
C. Social security.
D. Rural reconstruction.
**Ans**
**(C)**

Q83.The gas that causes suffocation and death when coal or coke is burnt in a closed room is –
A. Methane
B. Ethane
C. Carbon di-oxide
D. Carbon monoxide
**Ans**
**(D)**

Q84.Who invented the Safety razor ?
A. Steve Cher
B. Steve Job
C. Lar Strauss
D. Gillette
**Ans**
**(D)**

Q85.Which of the following memories must be refreshed many times per second ?
A. ROM
B. EPROM
C. Static RAM
D. Dyanamic RAM
**Ans**
**(D)**

Q86.Soilless agriculture refers to –
A. Hygroponics
B. Hydroponics
C. Sericulture
D. Inter-cropping
**Ans**
**(B)**

Q87.Which factor is necessary for the development of democratic institutions ?
A. Respect for individual rights
B. A one-party system
C. Strong military forces
D. An agricultural economy
**Ans**
**(A)**

Q88.Dry ice is solid form of –
A. Water
B. Nitrogen
C. Air
D. Carbon di-oxide
**Ans**
**(D)**

Q89.The Indian, who won the Grammy Award 2015 in the new age album category is –
A. Musician A.R. Rehman
B. Musician Ricky Kej
C. Singer Kavita Krishnamurthy
D. Author Neela Vaswani
**Ans**
**(B)**

Q90.Barter transactions means –
A. Coins are exchanged for goods.
B. Goods are exchanged with goods.
C. Money acts as a medium of exchange.
D. Goods are exchanged with gold.
**Ans**
**(B)**

Q91.Which of the following property of sound is affected by change in air temperature ?
A. Intensity
B. Wavelength
C. Amplitude
D. Frequency
**Ans**
**(B)**

Q92.A bullet of mass 'm' and velocity 'a' is fired in to a large block of wood of mass 'M'. The final velocity of the system is –
A. $\frac{M}{m+M}a$
B. $\frac{m+M}{M}a$
C. $\frac{m}{m+M}a$
D. $\frac{m+M}{m}a$
**Ans**
**(C)**

Q93.Who among the following rulers abolished Jaziya ?
A. Akbar
B. Aurangzeb
C. Jahangir
D. Balban
**Ans**
**(A)**

Q94.When number of turns in a coil is trippled, without any change in the length of coil, its self inductance becomes ?
A. nine times
B. six times
C. three times
D. one-third
**Ans**

**(C)**

Q95.Eddie Redmayne, won the Oscar (2015) for Best Actor for which film ?
A. Birdman
B. None of the options
C. Still Alice
D. The Theory of Everything
**Ans**
**(D)**

Q96.The Industrial Development Bank of India was set up in –
A. July 1968
B. July 1964
C. July 1962
D. July 1966
**Ans**
**(B)**

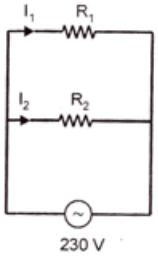
Q97.'Cloud burst' means –
A. Presence of scattered flakes of cloud in the sky.
B. Formation of artificial rain.
C. Sowing of seeds of a crop in cloudy weather.
D. Abnormally heavy downpour of rain, associated with a thunderstorm.
**Ans**
**(D)**

Q98.Which U.S. President announced the "New Deal" for economic recovery in the aftermath of the Great Depression ?
A. Roosevelt
B. Abraham Lincoln
C. Benjamin Franklin
D. J. F. Kennedy
**Ans**
**(A)**

Q99.Phycology is the study of –
A. Lichens
B. Bacteria
C. Fungi
D. Algae
**Ans**
**(D)**

Q100.'Red Data Book' provides an account of ?
A. Endangered plants and animals
B. Fossil plants
C. Endangered plants only
D. Extinct animals only
**Ans**
**(A)**

Q101.Two incandescent bulbs of rating 230 V, 100 W and 230 V, 500 W are connected in parallel across the mains. As a result, what will happen?
A. 100 W bulb will glow brighter
B. 500 W bulb will glow brighter
C. Both the bulbs will glow equally bright
D. Both the bulbs will glow dim
**Ans**
**(B)**
**Solution:**




$R_1 = \frac{230^2}{100} = 529\Omega$

$R_2 = \frac{230^2}{500} = 105.8\Omega$

$I_1 = \frac{230}{529} A, I_2 = \frac{230}{105.8} A$

As $I_2 > I_1$

Then, $VI_2 > VI_1$

500 W bulbs will glow brighter

Q102.In two wattmeter method of measurement of three-phase power of a balanced load, if both the wattmeters indicate the same reading, then the power factor of the load is

A. 0.5 lagging

B. less than 0.5 lagging

C. unity

D. greater than 0.5 lagging

**Ans**

(C)

**Solution:**

$\phi = \tan^{-1}\sqrt{3}\left(\frac{W_1 - W_2}{W_1 - W_2}\right)$

$\phi = \tan^{-2}\sqrt{3}\left(\frac{W_1 - W_2}{W_1 + W_2}\right) = 0$

$= cos\phi = cos0° = 1$

Q103.A current wave starts at zero, rises instantaneously, then remains at a value of 20A for 10 sec., then decreases instantaneously, remaining at a value of – 10 A for 20 sec., and then repeats this cycle. The rms value of the wave is

A. 22.36 A

B. 17.32 A

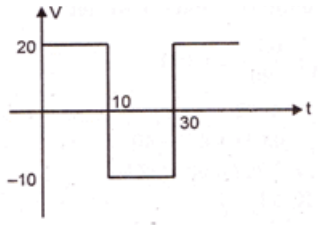
C. 8.165 A

D. 14.14 A

**Ans**

(D)

**Solution:**




RMS value of the wave

$= \sqrt{\frac{20^2 \times 10 + 10^2 \times 20}{30}}$

$= \sqrt{\frac{6000}{30}} = \sqrt{200} = 14.14 A$

Q104.An AC voltage source with an internal impedance $Z_1$ is connected to a load of impedance $Z_2$. For maximum power transfer to the load, the condition is

A. $|Z_2| = |Z_1|$

B. $Z_2 = Z_1$

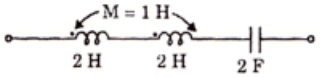
C. $Z_2^* = -Z_1$

D. $Z_2 = Z_1^*$

**Ans**

(D)

Q105.The resonant frequency of the AC series circuit shown in figure given below, in Hz, is




A. $\frac{1}{4\pi\sqrt{3}}$

B. $\frac{1}{4\pi\sqrt{2}}$

C. $\frac{1}{4\pi}$

D. $\frac{1}{2\pi\sqrt{10}}$

**Ans**

(A)

**Solution:**

$L_{eq} = L_1 + L_2 + 2M$

$= 2 + 2 + 2 = 64$

$f = \frac{1}{2\pi\sqrt{L_{eq}C}} = \frac{1}{2\pi\sqrt{6\times2}} = \frac{1}{4\pi\sqrt{3}}$ Hz

Q106.If in an R-L-C series circuit the current lags the applied voltage by 60° then

A. $X_L - X_c = \frac{R}{\sqrt{3}}$

B. $X_L - X_c = \sqrt{3}\,R$

C. $X_L - X_c = R$

D. $X_L = X_c = R$

**Ans**

(B)

**Solution:**

$\tan\phi = \frac{X_L - X_C}{R}$

$\Rightarrow X_L - X_c = (tan60°)\,R = R\sqrt{3}$

Q107.A lossy capacitor with loss angle of 0.01 radian, draws a current of 0.5 A when supplied at 1000 V from a sinusoidal voltage source. The active power consumed by the capacitor is

A. 5 W

B. 10 W

C. 2 W

D. 1 W

**Ans**

(A)

**Solution:**

Active power consumed $= P = VI \tan\phi$

$= 1000 \times 0.5 \times 0.01 = 5W$

Q108.For use in ac circuits, potential coil circuit of eloctrodynamic wattmeter should be purely

A. resistive

B. inductive

C. capacitive

D. reactive

**Ans**

(A)

Q109.The voltage wave given by v = cos @t produces a current wave i = 1.5 cos @t -2.598 sin @t in a circuit. The current wave

A. leads voltage wave by 60°

B. lags voltage wave by 60°
C. leads voltage wave by 30°
D. lags voltage wave by 30°
**Ans**
(A)
**Solution:**

$$i = 1.5\cos\omega t - 2.598\sin\omega t$$
$$= \sqrt{1.5^2 + 2.598^2}\left[\frac{1.5\cos\omega t}{\sqrt{1.5^2+2.598^2}} - \frac{2.598}{\sqrt{1.5^2+2.598^2}}\sin\omega t\right]$$
$$= \cos\phi\cos\omega t - \sin\phi\sin\omega t \left[\phi = \tan^{-1}\frac{2.598}{1.5} = 60°\right]$$
$$i = \cos(\phi + \omega t)$$
$$i = \cos(\omega t + 60°)$$

current leads the voltage wave by 60°.

Q110.The damping in D'Arsonval galvanometer is obtained by
A. a shunt connected across moving coil
B. eddy current induced in metal discs
C. fluid friction
D. employing springs
**Ans**
(B)

Q111.If θ represents deflection of pointer, the controlling torque in a spring-controlled indicating instrument is proportional to
A. $\theta$
B. $\theta^2$
C. $\frac{1}{\theta}$
D. $\sin\theta$
**Ans**
(A)
**Solution:**
$T_c = k\theta$ (for spring – controlled instrument) k is a constant

Q112.The range of a dc milli ammeter can be extended by using a
A. low resistance in series
B. low resistance shunt
C. high resistance in series
D. high resistance shunt
**Ans**
(B)

Q113.The response time of an indicating instrument is determined by its
A. deflecting system
B. damping system
C. controlling system
D. support type to the moving system
**Ans**
(B)

Q114.The ratio of the reading of two wattmeters connected to measure active power in a balanced 3-phase load is 2 : 1. The power factor of the load is
A. 0.866 lag
B. 0.866 lead
C. 0.866 lag or lead
D. None of the above
**Ans**
(C)

**Solution:**

$\cos\phi = \cos\tan^1\sqrt{3}\left(\frac{W_1-W_2}{W_1+W_2}\right)$

As $W_1 = 2W_2$

$\cos\phi = \cos\tan^{-1}\frac{\sqrt{3}}{3} = \cos\frac{\pi}{6} = 0.866$ (leading)

For $W_2 = 2W_1$

$\cos\phi = -0.866$ (lagging)

Q115.The power input to a 3-phase, 50 Hz, 400 V, 4-pole induction motor is 60 kW and its stator losses are 1 kW. If this motor is running at 4% slip, the rotor copper loss is

A. 1.18 kW
B. 2.36 kW
C. 0.18 kW
D. 0.36 kW

**Ans**

**(B)**

**Solution:**

Power input to rotor, $P_G = 60 - 1 = 59kW$

Rotor copper loss, $P_{cu} = SP_G$

$= 59 \times 0.04 = 2.36$ kW

Q116.In a transformer, the core loss is found to be 46 W at 50 Hz and is 80 W at 70 Hz, both losses being measured at the same peak flux density. The hysteresis loss and eddy current loss at 60 Hz is

A. 11 W, 20 W
B. 30 W, 45 W
C. 16 W, 30 W
D. 22 W, 40 W

**Ans**

**(D)**

**Solution:**

$46 = P_e + P_u$

$46 = k_1 f_1 + k_2 f_1 = k_1\,50^2 + k_2\,50$ .....(a)

And

$80 = k_1 f_2^2 + k_2 f_1 = k_1 70^2 + k_2 70$ .....(b)

Solving equation (a) and (b), we get

$k_1 = \frac{0.22}{20} = 0.011$

$k_2 = 0.362$

At 60W, $P_e = 0.011\times 60^2 = 40$ W

$P_u = 0.362\times 60 = 22W$

Q117.Measurement of _____ is affected by the presence of thermo-emf in the measuring circuit.

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

**Ans**

**(A)**

Q118.A 220 V shunt motor develops a torque of 60 Nm at an armature current of 10 A. The torque developed when the armature current is 20 A, is

A. 30 Nm
B. 240 Nm
C. 84 Nm
D. 120 Nm

**Ans**

**(D)**

**Solution:**

$T = K_1 \phi I_a$

$\frac{T_1}{T_2} = \frac{I_{a1}}{I_{a2}}$

[$\phi$ is constant for DC shunt motor]

$\Rightarrow T_2 = T_1 \times \frac{I_{a2}}{I_{a_1}} = 60 \times \frac{20}{10} = 120$ N – m

Q119.In a 3-phase synchronous generator, the stator winding is connected in star, because a delta connection would
A. have circulating currents due to triplen harmonics
B. require more insulation and 'conductor material
C. require larger conductor and more core material
D. result in a short circuit
**Ans**
**(B)**

Q120.A dc shunt generator builds up to 230 V. Other conditions remaining same, if only the residual magnetism of the original machine is reversed, the voltage to which the generator will build up is
A. 230 V with brush polarity reversed
B. 230 V with brush polarity same
C. somewhat less than 230 V with brush polarity reversed
D. somewhat less than 230 V with brush polarity same
**Ans**
**(A)**

Q121.A 100 kVA single phase transformer exhibits maximum efficiency at 80% of full load and the total loss in the transformer under this condition is 1000 W. The ohmic losses at full load will be
A. 781.25 watt
B. 1250 watt
C. 1562.5 watt
D. 12500 watt
**Ans**
**(A)**
**Solution:**

At maximum efficiency, $P_i = P_{cu}\, k^2$

And $P_i + k^2 P_{cu} = 1000$

$\Rightarrow 2P_i = 1000$

$\Rightarrow P_i = 500W$

$P_{cu} = \frac{500}{0.8^2} = 781.25W$

Q122.If a 3-phase induction motor hums during starting up, the probable cause could be
A. un equal stator phase resistance
B. open circuited rotor
C. inter turn short circuit on rotor
D. any of the above
**Ans**
**(D)**

Q123.An alternator has rated field current of 3 A. It is developing 180 V at a field current of 1.5 A at rated speed. If its field current is made 3 A at rated speed, then the generated voltage would be
A. 360 V
B. 180 V
C. less than 360 V
D. 270 V
**Ans**
**(C)**

Q124.A 40 kVA transformer has a core loss of 400 W and full load copper loss of 800 W. The fraction of rated load at maximum efficiency is
A. 50%
B. 62.3%
C. 70.7%

D. 100%
**Ans**
(C)
**Solution:**
At maximum efficiency, $k^2 P_{cu} = P_i$ k is the load factor
$\Rightarrow k = \sqrt{\frac{P_i}{P_{cu}}} = \sqrt{\frac{400}{800}} = 70.7\%$

Q125.The torque developed in a dc series motor in unsaturated magnetic circuit condition is
A. almost practically constant at all load currents
B. directly proportional to the load current
C. directly proportional to the square of load current
D. inversely proportional to the square of load current
**Ans**
(C)

Q126.In suspension type insulator the potential drop is
A. maximum across the lowest disc
B. maximum across the topmost disc
C. maximum across the disc at the midpoint of the string
D. uniformly distributed across the string
**Ans**
(A)

Q127.Of the following water turbines, which is not a reaction turbine?
A. Pelton wheel
B. Kaplan turbine
C. Propeller turbine
D. Francis turbine
**Ans**
(A)
**Solution:**
Pelton wheel is an impulse type turbine.

Q128.If the speed of a universal motor in ac operation is $N_{ac}$ and in dc operation is $N_{dc}'$ ( and I = current, V = supply voltage, r = resistance, X = reactance, cos ϕ = power factor) then the speed ratio
A. $\frac{N_{ac}}{N_{dc}} = \frac{\cos\phi - \frac{IX}{V}}{1 - \frac{Ir}{V}}$
B. $\frac{N_{ac}}{N_{dc}} = \frac{1 - \frac{Ir}{V}}{\cos\phi - \frac{IX}{V}}$
C. $\frac{N_{ac}}{N_{dc}} = \frac{1 - \frac{Ir}{V}}{\cos\phi - \frac{Ir}{V}}$
D. $\frac{N_{ac}}{N_{dc}} = \frac{\cos\phi - \frac{Ir}{V}}{1 - \frac{Ir}{V}}$
**Ans**
(C)

Q129.Sheaths are used in underground cables to
A. provide proper insulation
B. provide mechanical strength
C. protect the cable from moisture
D. None of the above
**Ans**
(D)

Q130.If the frequency of a transmission system is changed from 50 Hz to 100 Hz, the string efficiency
A. will increase
B. will decrease

C. remains unchanged
D. may increase or decrease depending on the line parameters
**Ans**
**(C)**

Q131.The function of oil in a transformer is to provide
A. Insulation and cooling
B. Protection against lightning
C. Protection against short circuit
D. Lubrication
**Ans**
**(A)**
**Solution:**
Transform oil is basically used for both insulation and cooling purpose.

Q132.A coil of 1000 turns is wound on a core. A current of 1A flowing through the coil creates a core flux of 1m wb. The energy stored in the magnetic field is
A. 0.25J
B. 0.5J
C. 1J
D. 2J
**Ans**
**(B)**
**Solution:**

$$E = \frac{1}{2} Li^2 = \frac{1}{2}\left(\frac{N\phi}{i}\right) \times i^2$$
$$= \frac{1}{2} \times 1000 \times 10^{-3} \times 1 = \frac{1}{2} J$$

Q133.Two transformers operating in parallel will share the load depending upon their
A. Rating
B. Leakage reactance
C. Efficiency
D. Per unit impedance
**Ans**
**(D)**
**Solution:**
Load sharing of the transformers are depend on their per unit impedance on its own base.

Q134.Consider the following statements; the speed of a D.C. motor can be controlled by the variation of
1. Armature voltage
2. Field current
3. Armature circuit resistance
4. Angle of brush shift
Which of these statement are correct?
A. 1, 2 and 3
B. 2, 3, and 4
C. 1, 3 and 4
D. 1, 2 and 4
**Ans**
**(A)**
**Solution:**
Angle of brush shift may be varied to improve commutation it has nothing to do with speed control.

Q135.What is the increase in the torque expressed as percentage of initial torque, if the current drawn by a D.C. series motor is increased from 10A to 12A (Neglect saturation)
A. 21%
B. 25%
C. 41%
D. 44%
**Ans**
**(D)**
**Solution:**

Assuming for the motor to be a d.c. series motor as saturation has to be neglected.

$T \alpha I_a^2$

$\therefore T_2 = 1.44T_1$

$\%$ increase in the torque $= \frac{0.44T_1}{T_1} \times 100 = 44\%$

Q136.Consider the following:
1. Supply voltage
2. Excitation current
3. Maximum value of load angle
The maximum power developed by a synchronous motor is a function of which of the above
A. 1 and 2
B. 1 and 3
C. 2 and 3
D. 1, 2 and 3
**Ans**
(A)
**Solution:**

$P = P_{max} \times \sin\delta = \frac{E_f.V_t}{X_s} sin\delta$

$\Rightarrow P_{max} \propto E_f.V_t$

Q137.Which one of the following method gives more accurate result for determination of voltage regulation of an alternator
A. M. m. f. method
B. Synchronous impedance method
C. Potier triangle method
D. American Institution standard method
**Ans**
(C)
**Solution:**
Potier triangle method is more accurate to determine voltage regulation of an alternator.

Q138.Which one of the following is not a necessary condition to be satisfied for synchronizing an incoming alternator to an already operating alternator?
A. Same voltage magnitude
B. Same frequency
C. Same prime mover speed
D. Same phase sequence
**Ans**
(C)
**Solution:**
To share load prime mover speeds have to be different.

Q139.Which one of the following statements is correct? A smaller gap in a polyphase induction motor helps to
A. Reduce the chances of crawting
B. Increase the starting torque
C. Reduce the chance of cogging
D. Reduce the magnetizing current
**Ans**
(D)
**Solution:**
Small air gap ⇒ lower reluctance ⇒ higher inductance ⇒ Smaller magnetizing current.

As $I \alpha \frac{1}{L}$ from eqn. N. $\phi = LI$

Q140.Which one of the following statements is correct? In an induction motor, if the air gap is increased,
A. Its speed will reduce
B. Its efficiency will improve
C. Its power factor will reduce
D. Its break down torque will reduce
**Ans**

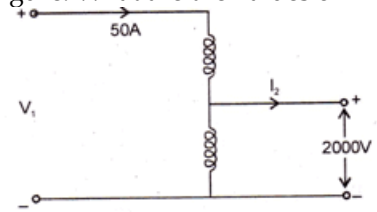
(C)
**Solution:**
In an induction motor, if the air gap is increased then its power factor will reduce.

Q141.The supply voltage to an induction motor is reduced by 10%. By what % approximately, will the maximum torque decrease?
A. 5%
B. 10%
C. 20%
D. 40%
**Ans**
(C)
**Solution:**
$T_{max}\ \alpha\ V^2$

Q142.Which one of the following types of motors is most suitable for a computer printer drive?
A. reluctance motor
B. Hysteresis motor
C. Shaded pole motor
D. Stepper motor
**Ans**
(D)
**Solution:**
Stepper motor is most suitable for a computer printer drive.

Q143.A coil of 1000 turns is wound on a core. A current of 1A flowing through the coil creates a core flux of 1mWb. What is the energy stored in the magnetic field?
A. $\frac{1}{4}$J
B. $\frac{1}{2}$J
C. 1 J
D. 2 J
**Ans**
(B)
**Solution:**
$N\phi = L_i \Rightarrow \mathrm{L} = 1\mathrm{H}$
$\Rightarrow W_E = \frac{1}{2}Li^2 = \frac{1}{2}\mathrm{J}$

Q144.A 1-ϕ, 10 KVA, 2000/200V, 50Hz transformer is connected to form an auto transformer as shown in the figure. What are the values of $\mathrm{V_1}$ and $\mathrm{I_2}$ respectively.




A. 2200V, 55A
B. 2200V, 45A
C. 2000V, 45A
D. 1800V, 45A
**Ans**
(D)
**Solution:**
$V_1 = 2000 - 200 = 1800\mathrm{V}$ due to opposite polarity connection
$(KVA)_{auto} = 1800\ \ 50$
$\Rightarrow I_2 = \frac{1800\times 50}{2000} = 45A$

Q145.Three $1\text{-}\phi\ 1100/220V$ transformers are connected to form $3\text{-}\phi$ transformer bank. High voltage side is connected in star and low voltage side is in delta. What are the voltage ratings and turn ration of 3- transformer?

A. $19052/220V, 50$

B. $19052/220V, 50\sqrt{3}$

C. $11000/381V, 50\sqrt{3}$

D. $11000/220V, 50$

**Ans**

**(B)**

**Solution:**

$V_1 = 11000\times\sqrt{3}\,V$ (star-connection)

$V_2 = 220\,V$ (delta – connection)

$\therefore V_1 : V_2 = 19052 : 220$ V and

$\frac{N_1}{N_2} = \frac{V_1}{V_2} = 50\sqrt{3}$

Q146.In a D.C. compound generator, "flat-compound" characteristic, required for certain applications, may be obtained by connecting a variable resistance.

A. Across the series field

B. In series with the series field

C. In parallel with the shunt field

D. In series with the shunt field

**Ans**

**(A)**

**Solution:**

Variable resistance in parallel with the series field winding is called diverter.

Q147.A synchronous motor is operated from a bus voltage of 1.0 P.U. and is drawing 1.0 P.U. zero power factor leading current. Its synchronous reactance is 0.5 P.U. What is the excitation emf of the motor.

A. 2.0

B. 1.5

C. 1.0

D. 0.5

**Ans**

**(D)**

**Solution:**

$E_f = V_t - I_a X_s = 1\angle 0°\times 0.5 = 0.5\,P.U.$

Q148.In the measurement of $X_d'\ X_q$ (in ohms) following data are obtained by the slip test on a salient pole machine;

$I_d$ max $= 10A$, $I_d$ min $= 6.5$ A

$V_d$ max $= 30V$, $V_d$ min $= 25$ V

Which one of the following is correct.

A. $x_d = 3, x_q = 3.86$

B. $x_d = 4.615, x_q = 2.5$

C. $x_d = 3, x_q = 2.5$

D. $x_d = 4.61, x_q = 3.86$

**Ans**

**(B)**

**Solution:**

$X_d = \frac{30}{6.5} = 4.615\Omega, X_q = \frac{25}{10} = 2.5\Omega$

Q149.What are the conditions to be satisfied for alternator to be synchronized with an incoming supply?

1. Equal voltage
2. Equal frequency
3. Same power rating
4. Same phase sequences

Select correct answer

A. 2, 3 and 4
B. 3 and 4
C. 1, 2 and 3
D. 1, 2 and 4
**Ans**
(D)
**Solution:**
Same power rating has nothing to do with synchronization.

Q150.The stator and the rotor of a $3\text{-}\phi,\ 4$ pole wound rotor induction motor are excited, respectively, from a 50 Hz and a 30 Hz source of appropriate voltage. Neglecting all losses what is the possible no-load speeds at which the motor would run?
A. 1500 rpm and 900 rpm
B. 2400 rpm and 600 rpm
C. 2400 rpm only
D. 600 rpm only
**Ans**
(B)
**Solution:**
$N_s(stator\ field) = \frac{120\times30}{4} = 900 \text{ rpm}$
$\therefore N_r = 1500 \pm 900 = 2400 \text{ rpm}, 600 \text{ rpm}.$

Q151.$\text{A current i} = (10 + 10 \text{ sint})$ amperes is passed through moving iron type ammeter. Its reading will be
A. zero
B. 10A
C. √150 A
D. √2 A
**Ans**
(C)
**Solution:**
$\text{Given Current (i)} = (10 + 10 \sin t) \text{ A}$
$\left(I_{rms} = \frac{I_0}{\sqrt{2}}\right)$
$i_{reading} = I_{rms} = \sqrt{10^2 + \left(\frac{10}{\sqrt{2}}\right)^2} = \sqrt{150}\ A$
So, if reading current will be $\sqrt{150}\ A$.

Q152.A DC ammeter has resistance of 0.1 Ω and current range is 0 -100 A. If the range is to be extended to 0 -500A, then meter requires shunt resistance of
A. 0.010Ω
B. 0.011Ω
C. 0.025Ω
D. 1.0Ω
**Ans**
(C)
**Solution:**
$m = \frac{I_{ext}}{I_m}$
$= \frac{500}{100} = 5$
Shunt resistance,
$R_{sh} = \frac{R_m}{m-1}$
$= \frac{0.1}{5-1} = \frac{0.1}{4} = 0.025\Omega$
So, the value of shunt resistance is 0.025Ω.

Q153.In which type welding is pool of molten metal used?
A. Electro slag
B. Submerged arc
C. MIG

D. TIG
**Ans**
**(A)**

Q154.Plan and butt welds may be used on materials up to approximately
A. 25 mm thick
B. 40 mm thick
C. 50 mm thick
D. 70 mm thick
**Ans**
**(A)**

Q155.In arc welding, arc is created between the electrode and work by
A. flow of current
B. voltage
C. material thickness
D. contact resistance
**Ans**
**(D)**

Q156.Mho relay is used to protect?
A. long transmission line
B. medium length line
C. short length line
D. All the above
**Ans**
**(A)**

Q157.For arc heating, the electrodes are made of
A. copper
B. aluminium
C. graphite
D. ACSR conductor
**Ans**
**(C)**

Q158.The most common type of three phase in unsymmetrical fault is
A. single line to ground
B. line to line
C. double line to ground
D. three phase
**Ans**
**(A)**

Q159.If supply frequency increases, the skin effect is
A. decreased
B. increased
C. remains same
D. None of these
**Ans**
**(B)**
**Solution:**
Here the formula for Skin depth is given by

$$\delta = \frac{1}{\sqrt{\pi \mu_0 \mu_r f \sigma}}$$

$$\Rightarrow \delta \uparrow, \delta \downarrow, skin\ effect\ \uparrow$$

$$\uparrow = increase, \downarrow = decrease$$

So, the supply frequency increase with the increased skin effect.

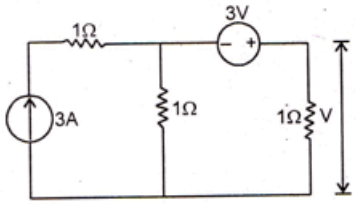
Q160.A PN junction is
A. a rectifier
B. an amplifier

C. an insulator
D. an oscillator
**Ans**
**(A)**

Q161.Megger is an instrument to measure
A. a very low resistance
B. insulation resistance
C. Q of coil
D. inductance of coil
**Ans**
**(B)**

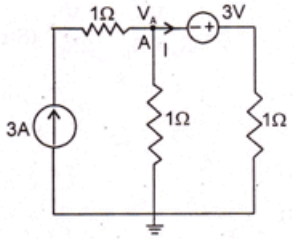
Q162.Arc lamp operates at
A. low lagging power factor
B. high leading power factor
C. unity power factor
D. zero power factor
**Ans**
**(A)**

Q163.The value of V in the circuit shown in the given figure is




A. 1V
B. 2V
C. 3V
D. 4V
**Ans**
**(C)**
**Solution:**
Let Voltage at node A is $V_A$ in figure
Now applying Nodal analysis at A

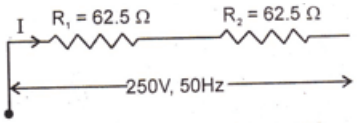
$$3 = \frac{V_A}{1} + \frac{V_A+3}{1}$$
$$= V_A + V_A + 3$$
$$2V_A + 3 = 3$$




$$V_A = 0$$
$$\text{So Current, } I = \frac{V_A+3}{1} = \frac{0+3}{1} = 3A$$
$$\text{V} = \text{IR} = 3 \times 1 = 3\text{V}$$

Q164.Two heaters rated a 1000W, 250V each are connected in series across a 250V, 50 Hz AC mains. The total power drawn from the supply would be
A. 1000 watt
B. 500 watt
C. 250 watt
D. 2000 watt
**Ans**
**(B)**

**Solution:**



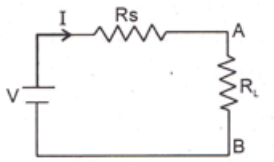

Here the required figure is
Rating of heaters = (1000 W, 250 V)
$R = \frac{V^2}{P} = \frac{(250)^2}{1000} = 62.5\Omega$
Total Resistance (R) $= R_1 + R_2$
$= 62.5 + 62.5 = 125\Omega$
Power drawn
$\therefore P = \frac{V^2}{R} = \frac{(250)^2}{125} = 500$ watt
So the total power down from the supply is 500 W.

Q165.Area of hysteresis loop represents
A. copper loss
B. eddy current loss
C. dielectric loss
D. hysteresis loss
**Ans**
(D)

Q166.Two coupled coils with $L_1 = L_2 = 0.6$ have a coupling coefficient of $K = 0.8$. The turn ratio $\frac{N_1}{N_2}$ is
A. 4
B. 2
C. 1
D. 0.5
**Ans**
(C)
**Solution:**
As we know that
$L = \frac{\mu_0 N^2 A}{L} \Rightarrow L \propto N^2$
N = No. of turns
L = Inductance
$\frac{L_1}{L_2} = \frac{N_1^2}{N_2^2}$

$\Rightarrow \frac{N_1}{N_2} = \sqrt{\frac{L_1}{L_2}} = \sqrt{\frac{0.6}{0.6}} = 1$
So the turns ratio $\frac{N_1}{N_2}$ is 1.

Q167.The efficiency for maximum power transfer to the load is
A. 25%
B. 50%
C. 75%
D. 100%
**Ans**
(B)
**Solution:**
Here the required fig is




For maximum power transfer to load

$Z_L = Z_s$ or $R_L = R_s$

$I = \frac{V}{R_s + R_L} = \frac{V}{2R_s}$ (Since $R_L = R_s$)

$P_{in} = V.I = (R_s + R_L).I$

$= I^2(R_s + R_L) = I^2(2R_s)$

$P_{out} = P_{load} = I^2R_L = I^2R_s$

$\eta = \frac{P_{out}}{P_{in}}$

$= \frac{I^2(R_s)}{I^2(2R_s)} = \frac{1}{2} = 0.5$

$\% \eta = 50\%$

So the efficiency for maximum power transfer.

Q168.In synchronous motor, minimum armature current occurs at
A. zero power factor
B. leading power factor
C. lagging power factor
D. unity power factor
**Ans**
**(D)**

Q169.High speed alternators usually have
A. salient pole rotor
B. cylindrical rotor
C. both salient pole and cylindrical rotor
D. None of the above
**Ans**
**(B)**

Q170.The field winding of an alternator requires
A. DC supply
B. AC supply
C. Pulsating DC
D. Any of the above
**Ans**
**(A)**

Q171.A centre zero ammeter connected in the rotor circle of a 6 pole, 50 Hz induction motor makes 30 oscillations in one minute. The rotor speed is
A. 670 rpm
B. 990 rpm
C. 1010 rpm
D. 1030 rpm
**Ans**
**(B)**
**Solution:**
Since ammeter has 30 oscillations in one minute,
So Rotor current has a frequency

$f = \frac{30}{60}$
$= \frac{1}{2}$
$= 0.5$ Hz
$\because$ Rotor Frequency $f' = sf$
$s = \frac{f'}{f}$
$= \frac{0.5}{50} = \frac{1}{100} = 0.01$
And $N_s = \frac{120 \times f}{P}$
$= \frac{120 \times 50}{6}$
$= 1000$ rpm

$\because$ $s = \frac{N_s - N_r}{N_s}$
$0.01 = \frac{1000 - N_r}{1000}$
$N_r = 990$ rpm
So, the rotor speed is 990 rpm.

Q172.The permissible variation of frequency in power system $P_s$ is
A. $\pm 1\%$
B. $\pm 3\%$
C. $\pm 5\%$
D. $\pm 10\%$
**Ans**
(B)
**Solution:**
Ideal Range for frequency
$f = 50 \pm 1\% \Rightarrow 49.5$ to $50.5$ Hz
Practical/permissible Range
$f = 50 \pm 3\% \Rightarrow 48.5$ to $51.5$ Hz
So, the permissible variation of frequency in power system $(P_s)$ is $\pm 3\%$

Q173.For coding of large size generators hydrogen is used because
A. It offers reduced fire risk
B. It is light in weight
C. It is of high thermal conductivity
D. All the above
**Ans**
(D)

Q174.The connected load of a consumer is 2 kW and his maximum demand is 1.5 kW. The demand factor of the consumer is
A. 0.75
B. 0.375
C. 1.33
D. 1
**Ans**
(A)
**Solution:**
Demand factor
$D.F. = \frac{P_{max}}{Sum\ of\ connected\ load}$
$= \frac{1.5}{2}$
$= \frac{3}{4} = 0.75$
So the demand factor of consumer is 0.75

Q175.To meet the reactive power requirements at load centres usually
A. shunt capacitors are used
B. series capacitors are used
C. shunt reactors are used
D. tap changing transformers are used
**Ans**
**(A)**

Q176.The power factor will be leading in case of
A. Dielectric heating
B. Resistance heating
C. Induction heating
D. All the above
**Ans**
**(A)**

Q177.First law of thermodynamics furnishes the relationship between
A. heat and work
B. heat, work and properties of the system
C. various properties of the system
D. various thermodynamic processes
**Ans**
**(B)**

Q178.Which instrument has the lowest resistance?
A. Ammeter
B. Voltmeter
C. Megger
D. Frequency meter
**Ans**
**(A)**

Q179.The moving coil in a dynamometer wattmeter is connected
A. in series with the fixed coil
B. across the supply
C. in series with the load
D. Any one of the above
**Ans**
**(B)**

Q180.Triple point of a pure substance is a point at which
A. liquid and vapour exist together
B. solid and liquid exist together
C. solid and vapour exist together
D. solid, liquid and vapour phase exist together
**Ans**
**(D)**

Q181.Which of the following is not an internal combustion engine?
A. 2-stroke petrol engine
B. 4-stroke petrol engine
C. Diesel engine
D. Steam engine
**Ans**
**(D)**

Q182.Change of entropy depends upon
A. change of mass
B. change of temperature
C. change of specific heat
D. change of heat
**Ans**

**(D)**

Q183.Thermal plant works on
A. Carnot cycle
B. Joule cycle
C. Rankine cycle
D. All the above
**Ans**
**(C)**

Q184.Hooke's law holds good upto
A. yield point
B. limit of proportionality
C. breaking point
D. elastic limit
**Ans**
**(B)**

Q185.The percentage reduction in area in case of cast iron when it is subjected to tensile test is of the order of
A. 0%
B. 10%
C. 20%
D. 25%
**Ans**
**(A)**

Q186.A cantilever beam is deflected by d due to load P. If load is doubled, then deflection compared to earlier case will be changed by a factor of:
A. 2
B. 1/2
C. 1/8
D. 8
**Ans**
**(A)**

Q187.Principle plane is one which carries
A. no shear stress
B. maximum shear stress
C. no normal stress
D. maximum resultant of stresses
**Ans**
**(A)**

Q188.A universal dividing head is used to perform a milling operation by
A. plain indexing
B. direct indexing
C. differential indexing
D. compound indexing
**Ans**
**(C)**

Q189.In grinding operation, for grinding harder material
A. coarse grain size is used
B. fine grain size a used
C. medium grain size is used
D. any grain size may be used
**Ans**
**(B)**

Q190.When turning long shaft on a lathe, its bending can be prevented by
A. running the shaft at low speed
B. using high speed

C. using sturdy machine
D. using steady rest
**Ans**
**(D)**

Q191.The operation of sharpening a grinding wheel is called
A. trueing
B. dressing
C. aligning
D. balancing
**Ans**
**(B)**

Q192.In which of the following operations on lathe, will the spindle speed be minimum ?
A. Knurling
B. Fine finishing
C. Taper turning
D. Thread cutting
**Ans**
**(D)**

Q193.For drilling operation, the cylindrical job should always be clamped on a
A. collect
B. socket
C. jaw
D. V-block
**Ans**
**(C)**

Q194.Which of the following machines does not require quick return mechanism?
A. Slotter
B. Planer
C. Shaper
D. Broaching
**Ans**
**(A)**

Q195.Milling machine is classified as horizontal or vertical type, depending on the position of
A. spindle
B. work piece
C. milling cutter
D. work table or bed
**Ans**
**(A)**

Q196.The taper provided on pattern for its easy and clean withdrawal from the mould is called
A. taper allowance
B. draft allowance
C. distortion allowance
D. pattern allowance
**Ans**
**(B)**

Q197.Which of the following is not a casting process?
A. Carthias process
B. Extrusion
C. Semi-centrifuge method
D. Slush process
**Ans**
**(B)**

Q198.In arc welding, arc is created between the electrode and work by

A. flow of current
B. voltage
C. material characteristics
D. contact resistance
**Ans**
**(D)**

Q199.Oxygen to acetylene ratio in case of neutral flame is
A. 0.8 : 1.0
B. 1 : 1
C. 1.2 : 1
D. 2 : 1
**Ans**
**(B)**

Q200.In an parallel R-L-C circuit susceptance is equal to
A. $\frac{1}{X}$
B. $\frac{1}{R}$
C. $\frac{R}{Z^2}$
D. $\frac{X}{Z^2}$
**Ans**
**(A)**
**Solution:**
For Parallel RLC Circuit
$\frac{1}{Z} = \frac{1}{R} + J\left(\frac{1}{X_L} + \frac{1}{X_C}\right)$
$Y = \frac{1}{R} + J\left(\frac{1}{X}\right)$
For here Susceptance $= \frac{1}{X}$