Section I

Maximum Marks – 60 **Time – 45 minutes**

Instructions: -
1. There are total 60 question in this section.
2. All question have four choices out of which only one is correct.
3. There is no negative marking.

1. Find the unit place of 3674 x 8596 + 5699 x 1589
   a) 3 b) 4
   c) 5 d) 6

2. What will be the highest three digit number which when divided by 3, 7 and 21 leaves remainder 2?
   a) 978 b) 982
   c) 983 d) 989

3. Two persons A & B travelling towards each other from P & Q respectively which is 396 kms apart meet after 11 hours. Speed of A is 6 kms/hr more than B. Find the speed of B.
   a) 15 b) 18
   c) 21 d) 24

4. Train travelling at a speed of 90 km/hr crosses a man standing on a platform in 8 seconds. Find the time taken by the train to cross the platform of length 250 kms.
   a) 15 sec b) 16 sec
   c) 18 sec d) 20 sec

5. There are three numbers A, B and C. A is 50% of C and B is 75% of C, then A is what percentage of B?
   a) 66.66% b) 50%
   c) 75% d) 80%

6. A = 36% B, B = 6% C. If C = 100 then A is equal to –
   a) 2.18 b) 2.21
   c) 2.16 d) 2.24

7. A shopkeeper purchased two qualities of rice A & B. He bought 10 kg of rice A at Rs.35/kg and 20 kg rice B at Rs. 47/kg. Find the overall cost price per kgs if he mixes both types of rice.
   a) 43 b) 42
   c) 41 d) 40

8. Sachin has a batting average of 99 in 80 innings. He was out for duck in his 80^{th} innings. If he were to have a batting average of 100 how much should have been scored by him in his 80^{th} match?

a) 80 b) 180
c) 99 d) 100

9. A and B together can complete a particular task in 4 days. If A alone can complete the same task in 6 days, how many days will B take to complete the task if he works alone?

a) 8 b) 7
c) 12 d) None of these

10. If the perimeter of a rectangle is 138 metres and the difference between the length and the breadth is 7 metres, what is the area of the rectangle?

a) 1216 square meters b) 1147 square metres
c) 1184 square metres d) 1178 square metres

11. What will come in place of question mark (?) in the following question?
25% of 84 × 24% of 85 =?

a) 144.4 b) 244.4
c) 428.4 d) 333.4

12. If in a triangle ABC, AB = AC, $\angle A = x + 15°$, $\angle B = 2x + 25°$ then value of $\angle C$

a) 71° b) 51°
c) 61° c) 41°

13. A point P is located outside the circle with centre O. A tangent from point P touches the circle at A and a secant from P cuts the circle at B and C respectively. PA =12cm PC= 16cm. Find the length of chord BC.

a) 12 b) 8
c) 9 d) None of these

14. If $\sin A + \sin^2 A = 1$ then what is the value of $\cos^2 A + \cos^4 A$?

a) 0 b) 1
c) -1 d) 2

15. The length of a rectangular field is increased by 30% and breadth is decreased by 30%. What is the per cent increase or decrease in its area?

a) 9% increase b) 21% decrease
c) 21% increase d) 9% increase

16. If $a + b + c = 9$, $ab + bc + ca = 26$, $a^3 + b^3 = 91$, $b^3 + c^3 = 72$ and $c^3 + a^3 = 35$, then what is the value of abc?

a) 23 b) 24
c) 25 d) 26

17. The value of x for which the expressions 19 - 5x and 19x + 5 become equal is
a) 7/24 b) 7/12
c) 11/12 d) 11/24

18. If $x + y = 10$ and $x^2 + y^2 = 68$, then find xy
a) 18 b) 24
c) 17 d) 16

19. The mode and mean is given by 7 and 8, respectively. Then the median is:
a) 1/13
b) 13/3
c) 23/3
d) 33

20. If Mean of a, a+3, a+6, a+9 and a+12 is 10, then a is equal to;
a) 1
b) 2
c) 3
d) 4

Directions (21 – 25): Below each four pairs of words have been denoted by numbers (a), (b), (c), and (d). Find out which pair of words can be filled up in the blanks in the sentence in the same sequence to make the sentence meaningfully complete.

21. **Mr. Srinivasan is ___ to become Chairman of the group _____ the retirement of his father.**
(a) set, following (b) voted, subsequent
(c) selected, despite (d) approved, because

22. **___ to your error the ___ consignment has been delayed by a week.**
(a) According, important (b) Duly, urgent
(c) Owing, entire (d) Added, crucial

23. **On account of the ___ in sales the software firm has achieved an eight per cent ___ in net profit.**
(a) surge, fall (b) increase, rise
(c) decline, slope (d) hike, loss

24. **We are proud to say that today ___ 26 per cent of our total accounts are ___ by women and senior citizens.**
(a) approximate, held (b) nearly, authorized
(c) over, maintain (d) above, open

25. **The company has _____ special training to employees on _____ to trade online.**

(a) announced, benefits (b) offered, course
(c) imparted, risks (d) sanction, skills

26. In the following question, out of the four alternatives, select the word similar in meaning to the word given.

Cynicism

a) Conviction b) Bitterness
c) Credence d) Intuition

27. In the following question, out of the four alternatives, select the word similar in meaning to the word given.

Pinnacle

a) Culmination b) Nadir
c) Nethermost d) Basal

28. In the following question, out of the four alternatives, select the word opposite in meaning to the word given.

Befuddle

a) Baffle b) Daze
c) Fluster d) Explicate

29. In the following question, a sentence has been given in Direct/Indirect speech. Out of the four alternatives suggested, select the one which best express the same sentence in Indirect/Direct speech.

John said, "There is a monkey outside the window."

a) John said that there was a monkey outside the window.
b) John said that there is a monkey outside the window.
c) John says that there was a monkey outside the window.
d) John says that there is a monkey outside the window.

30. In the following question, a sentence has been given in Direct/Indirect speech. Out of the four alternatives suggested, select the one which best express the same sentence in Indirect/Direct speech.

She said, "I will have cooked the food by the time they arrive".

a) She said that she will have cooked the food by the time they would arrive.
b) She said that she would cooked the food by the time they will arrive.
c) She said that she would have cooked the food by the time they will arrive.
d) She said that she would have cooked the food by the time they arrived.

In the following question Q31 – Q32, a sentence has been given in Active/Passive Voice. Out of the four alternatives suggested, select the one which best expresses the same sentence in Passive/Active Voice.

31. **You'll be missing the sunshine in home.**
    a) You'll miss the sunshine in home.
    b) You would be missing the sunshine in home.
    c) You'll are going to be missing the sunshine in home.
    d) None of the above.

32. **The presiding officer vetoed the committee's decision.**
    a) The committee's decision is vetoed by the presiding officer.
    b) The committee's decision was vetoed by the presiding officer.
    c) The committee's decision has been vetoed by the presiding officer.
    d) The committee's decision is being vetoed by the presiding officer.

33. In the following question, out of the four alternatives, select the alternative which best expresses the meaning of the idiom/phrase.
Tight - lipped
    a) To have very thin lips
    b) To be boisterous
    c) To have a thin voice
    d) Unwilling to speak about an event

34. Out of the four alternatives, choose the one which can be substituted for the given words/sentence.
To confirm with the help of evidence
    a) Philanthropist
    b) Bilingual
    c) Refute
    d) Corroborate

35. In the following question, one part of the sentence may have an error. Find out which part of the sentence has an error and click the button corresponding to it. If the sentence is free from error, click the "No error" option.
Rohan had been playing (1) for his club since fifteen years, (2) but then his elbow got injured. (3) No error (4)
    a) Rohan had been playing
    b) for his club since fifteen years,
    c) but then his elbow got injured.
    d) No error

36. When was the Constitution of India amended for the first time?
    a) 1951 b) 1952
    c) 1950 d) 1953

37. Who wrote the book Indica?
a) Megasthenese
b) Aristotle
c) Chanakya
d) None of these

38. Soil contains decayed remains of living organisms. This is called _____.
a) Minerals
b) Biosphere
c) Saline Soil
d) Humus

39. Dairy comes under which sector of economic activity?
a) Tertiary sector
b) Primary sector
c) Secondary sector
d) Quaternary sector

40. Who is appointed as the first Lt. Governor of Union Territory of Ladakh?
a) Raj Manohar Joshi
b) G C Murmu
c) Satyapal Malik
d) R K Mathur

41. What phenomenon is responsible for twinkling of stars?
a) Diffraction
b) Refraction
c) Dispersion
d) Scattering of Light

42. What will be the power consumption of two 300 W bulbs, three 100 W fans and one 1200 W Refrigerator for continuous operation of 30 hours?
a) 54 kWh
b) 60 kWh
c) 63 kWh
d) None of these

43. What type of image is formed by the eye lens on the retina?
(a) Real and erect
(b) Virtual and inverted
(c) Real and inverted
(d) Virtual and erect

44. The magnetic field is the strongest at
(a) middle of the magnet.
(b) north pole.
(c) south pole.
(d) both poles.

45. The heating element of an electric iron is made up of:
(a) copper
(b) nichrome
(c) aluminium
(d) iron

46. A zygote which has an X-chromosome inherited from the father will develop into

(a) girl
(b) boy
(c) either boy or girl
(d) X-chromosome does not influence the sex of a child.

47. The ability of a cell to divide into several cells during reproduction in Plasmodium is called

(a) budding
(b) multiple fission
(c) binary fission
(d) reduction division

48. Tomato is a natural source of which acid?

(a) Acetic acid
(b) Citric acid
(c) Tartaric acid
(d) Oxalic acid

49. Which of the following has more inertia – a rubber ball and a stone of same size?

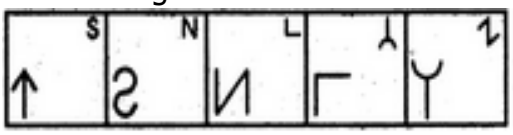
a) Rubber ball
b) Stone
c) Both have equal inertia
d) Both have zero

50. A bus at rest starts moving with an acceleration of 0.1 m/s^2. What will be its speed after 2 minutes?

a) 15 m/s
b) 18 m/s
c) 9 m/s
d) 12 m/s

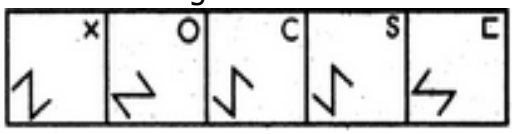
51. Select a figure from amongst the Answer Figures which will continue the same series as established by the five Problem Figures.

Problem Figures:



A B C D C

Answer Figures:



1 2 3 4 5

a) 4
b) 3
c) 1
d) 2

52. Marathon is to race as hibernation is to

a) winter
b) bear
c) dream
d) sleep

53. Choose the correct order of letters which are required to form a correct meaningful word

VARSTE

a) 2,3,1,6,4,5
b) 3,2,4,5,6,1
c) 4,5,2,3,1,6
d) 6,3,4,5,2,1

54. In these series, you will be looking at both the letter pattern and the number pattern. Fill the blank in the series.

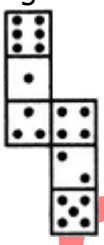
SCD, TEF, UGH, _____, WKL

a) CMN
b) VIJ
c) IJT
d) UJI

55. Introducing a boy, a girl said, "He is the son of the daughter of the father of my uncle." How is the boy related to the girl?

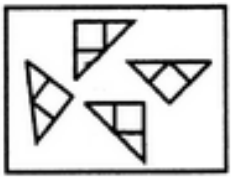
a) Brother
b) Nephew
c) Uncle
d) Son-in-law

56. How many dots lie opposite to the face having three dots, when the given figure is folded to form a cube?

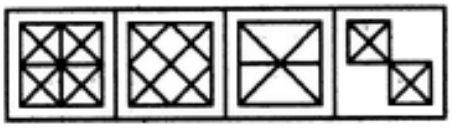


a) 2
b) 3
c) 5
d) 6

57. Find out which of the figures (1), (2), (3) and (4) can be formed from the pieces given in figure (X).



(X)



(1) (2) (3) (4)

a) 2
b) 3
c) 1
d) 4

58. Which of the following diagrams indicates the best relation between Travelers, Train and Bus ?

a) 

b) 

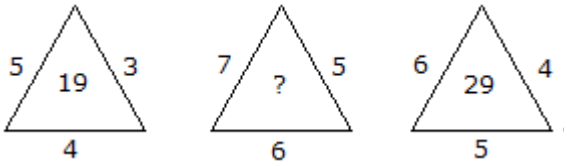
c) 

d) 

59. In a certain code language,
'134' means 'good and tasty';
'478' means 'see good pictures' and
'729' means 'pictures are faint'.
Which of the following digits stands for 'see'?

a) 1 b) 9
c) 8 d) None of these

60. Which one will replace the question mark ?



a) 24 b) 36
c) 29 d) 41

Section III (Electrical)

Maximum Marks – 50 Time – 30 minutes

Instructions: -1. There are total 50 question in this section.
2. All questions have four choices out of which only one is correct.
3. There is no negative marking.

Q1. A resistance of 30 ohm is connected across 240v supply. If a resistance R ohm is connected in parallel with 30ohm resistor across the same supply, the current drawn becomes triple of original one. The unknown resistor R is

a. 15ohm b. 10ohm
c. 5ohm d. None of these

2. Time constant in an R-L circuit is defined as the time taken by the current to become

(a) 36.8% of the final value (b) 36.8% of the initial value
(c) 63.2% of the final value (d) None of these

3. Which of the following types of instrument is an integrating instrument?

a. power factor meter b. energy meter
c. watt meter d. frequency meter

4. If a parallel circuit is opened in the main line, the current

(a) increases in the branch of the lowest resistance
(b) increases in each branch
(c) is zero in all branches
(d) None of these

5. Two plates of a parallel capacitor after being charged from a constant voltage source are separated apart by means of insulated handles, then the

(a) Voltage across the plates increases
(b) voltage across the plates decreases
(c) charge on the capacitor decreases
(d) None of these

6. "The total electric flux through any closed surface surrounding charges is equal to the amount of charge enclosed". The above statement is associated with

(a) Coulomb's square law (b) Gauss's law
(c) Maxwell's first law (d) Maxwell's second law

7. Which of the following statements is incorrect?

(a) The thinner the dielectric, the more the capacitance and the lower the voltage breakdown rating for a capacitor.
(b) A six-dot mica capacitor colour coded white, green, black, red and yellow has the capacitance value of 500 pF

(c) Capacitors in series provide less capacitance but a higher voltage breakdown rating for the combination
(d) None of these

8. A single core cable used on 33000 V has conductor diameter 10 mm and the internal diameter of sheath 25 mm. The maximum electrostatic stress in the cable is
(a) 62 x 105 V/m (b) 72 x 105 V/m
(c) 82 x 105 V/m (d) None of these

9. The total deficiency or excess of electrons in a body is known as
(a) charge (b) voltage
(c) potential gradient (d) None of these

10. A 200 turn coil has an inductance of 12 mH. If the number of turns is increased to 400 turns, all other quantities (area, length etc.) remaining the same, the inductance will be
(a) 6 mH (b) 14 mH
(c) 48 mH (d) None of these

11. A cable carrying alternating current has
(a) hysteresis losses only
(b) hysteresis and leakage losses only
(c) hysteresis, leakage and copper losses only
(d) None of these

12. The iron loss of a transformer at 400 Hz is 10 W. Assuming that eddy current and hysteresis losses vary as the square of flux density, the iron loss of the transformer at rated voltage but at 50 Hz would be ___ W.
(a) 80 (b) 640
(c) 1.25 (d) None of these

13. In DC machine yoke offers
(a) mechanical protection to the machine (b) flux path completion
(c) both A & B (d) None of these

14. If three transformers in delta-delta are delivering their rated and one transformer is removed, then overload on each of the remaining transformers is ____ %.
(a) 66.7 (b) 173.2
(c) 73.2 (d) None of these

15. The biggest advantage of T-T connection over the V-V connection for 3-phase power transformation is that it provides
(a) a set of balanced voltages under load
(b) a true 3-phase, 4-wire system
(c) a higher ratio of utilization
(d) None of these

16. If starting voltage of a SCIM is reduced to 50% of its rated value, torque developed is reduced by _____ % 0f its full load value.

(a) 50 (b) 25
(c) 75 (d) None of these

17. In a DSCM, outer cage is made of high resistance metal bars primarily for the purpose of increasing its

(a) speed regulation (b) starting torque
(c) efficiency (d) starting current

18. If starting winding of a single phase induction motor is left in the circuit, it will

(a) draw excessive current and overheat
(b) run slower
(c) run faster
(d) sparks at light loads

19. Each of the following statements regarding a shaded pole motor is true **EXCEPT**

(a) its direction of rotation is from un-shaded to shaded portion of the poles
(b) it has high starting torque
(c) it has very poor power factor
(d) None of these

20. In a single phase series motor, the main purpose of inductively wound compensating winding is to reduce the

(a) reactance e.m.f. of commutation
(b) rotational e.m.f. of commutation
(c) transformer e.m.f. of commutation
(d) None of these

21. A repulsion-start induction-run single-phase motor runs as an induction motor only when

(a) brushes are shifted to neutral plane
(b) short circuiter is disconnected
(c) commutator segments are short-circuited
(d) None of these

22. The energy stored in the magnetic field at a solenoid 30 cm long & 3 cm diameter wound with 1000 turns of wire carrying a current at 10 amp, is

(a) 0.015 joule (b) 0.15 joule
(c) 1.015 joule (d) None of these

23. Poles and zeros are arranged alternatively on negative real axis, then type of network is/are

(a) LC network (b) RC network
(c) both 2 and 3 (d) None of these

24. Tarapur nuclear power plant has which type of reactor?
(a) Pressurized water reactors (b) Boiling water type
(c) CANDU type reactors (d) None of these

25. What should be the minimum depth (in metre) of cable trench to dug for laying of 1.1 kV?
(a) 0.75 (b) 0.90
(c) 1.05 (d) None of these

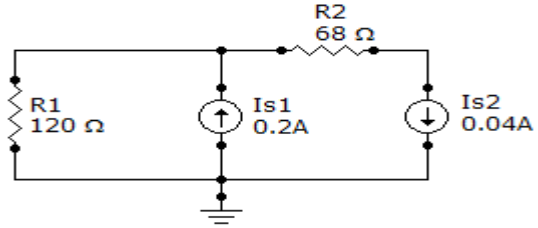
26. Maximum power transfer in a transmission line can be obtained by
(a) increasing voltage level (b) reducing reactance
(c) either 1 or 2 (d) none of these

27. In a Δ-connected source driving a Δ-connected load, the
(a) load voltage and line voltage are one-third the source voltage for a given phase
(b) load voltage and line voltage are two-thirds the source voltage for a given phase
(c) load voltage, line voltage, and source phase voltage are all equal for a given phase
(d) None of these

28. In a Y-connected circuit, the magnitude of each line current is
(a) three times the corresponding phase current
(b) one-third the phase current
(c) equal to the corresponding phase current
(d) None of these

29. Polyphase generators produce simultaneous multiple sinusoidal voltages that are separated by
(a) certain constant phase angles
(b) certain constant frequencies
(c) certain constant voltages
(d) None of these

30. Find the current through R_1 in the given circuit.



(a) 0.16 A (b) 0.24 A
(c) 0.2 A (d) None of these

31. To obtain a high value of capacitance, the permittivity of dielectric medium should be

(a) low (b) zero
(c) high (d) None of these

32. Five capacitors each of 5 μF are connected in series, the equivalent capacitance of the system will be

(a) 5 μF (b) 1 μF
(c) 10 μF (d) None of these

33. In balanced bridge, if the positions of detector and source are interchanged, the bridge will still remain balanced. This can be explained from which theorem

(a) Reciprocity theorem (b) Thevinin's theorem
(c) Norton's theorem (d) None of these

34. Power dissipation in ideal inductor is

(a) Maximum (b) Minimum
(c) Zero (d) None of these

35. The most modern method for food processing is

(a) Eddy current heating (b) Dielectric current
(c) Induction heating (d) None of these

36. The power factor will be leading in case of

(a) Induction heating (b) Resistance heating
(c) Dielectric heating (d) None of these

37. Which triggering is the most reliable?

(a) Forward voltage triggering (b) Gate triggering
(c) dV / dt triggering (d) None of these

38. After proper turn on of thyristor

(a) gate signal is always present
(b) gate signal must be removed
(c) gate signal should present but can be removed
(d) none of these

39. Thyristor can be protected from over voltages by using

(a) voltage clamping device (b) fuse
(c) heat sink (d) None of these

40. An alternator supplying a load with leading power factor always has --------- voltage regulation

(a) positive (b) negative
(c) unity (d) None of these

41. As compared to constant-current system, the constant-voltage system of charging a lead-acid cell has the advantage of

(a) increasing cell capacity (b) reducing time of charging
(c) both (a) and (b) (d) None of these

42. As compared to a lead-acid cell, the efficiency of a nickel-iron cell is less due to its

(a) lower e.m.f.
(b) smaller quantity of electrolyte used
(c) higher internal resistance
(d) None of these

43. Permanent-magnet moving coil ammeter has uniform scales because

(a) their deflecting torque varies directly as current
(b) they are spring-controlled
(c) both (a) and (b)
(d) None of these

44. The main purpose of using instrument transformers in *a.c.* measurements is to

(a) reduce the possibility of shock
(b) extend the range of ac instrument
(c) provide high transformation ratio
(d) None of these

45. The reactance offered by a capacitor to *a.c.* of frequency 50 Hz is 10 Ohm. If frequency is increased to 100 Hz, reactance becomes------Ohm.

(a) 20 (b) 5
(c) 2.5 (d) None of these

46. In a series *R-L-C* circuit, R= 100 Ohm, X_L= 300 Ohm and $X_{C=}$ 200 Ohm. The phase angle of the circuit is---- degrees.

(a) 0 (b) 90
(c) 45 (d) None of these

47. Higher the *Q* of a series circuit

(a) greater its bandwidth
(b) narrower its passband
(c) broader its resonance curve
(d) None of these

48. The power factor of an ordinary electric bulb is

(a) slightly less than unity (b) unity
(c) slightly more than zero (d) None of these

49. A parallel resonant circuit can be used
(a) as a high impedance
(b) to reject a small band of frequencies
(c) both (a) and (b)
(d) None of these

50. In a balanced 3-phase voltage generator, the different phase voltages reach their maximum values -------degree apart.
(a) 120 (b) 60
(c) 240 (d) None of these