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DMRC

Exam for Jr. Engineer - Electrical

Guide + Practice Workbook

Paper 1 - General Awareness, Logical Ability, Quantitative Aptitude, Knowledge of Electrical
Paper 2 - English Language

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DMRC PAPER PATTERN

Paper - 1 [120 Multiple choice questions in 1.5 hours with 1/3 negative marking]

Section	No. of questions (Tentative)
General Awareness	20
Logical Ability	20
Quantitative Aptitude	20
Knowledge of discipline/trade	60

Paper - 2 [60 Objective type questions on General English in 45 minutes with 1/3 negative marking.]

Paper 1 & 2 questions carry equal marks. Candidates who qualify in Paper-I and rank high on the merit list within the zone of consideration, as decided by the DMRC, will only be evaluated for Paper-II. Successful candidates based on the Written Test (Both Paper-I & Paper-II put together) shall be called for Personal Interview/Psycho, at Delhi.

Delhi Metro Rail Corporation

JUNIOR ENGINEER (ELECTRICAL) RECRUITMENT EXAM-2013

Time : 90 min. | **[Based on Memory]** | **Max. Marks : 120**

Instructions

1. *This question paper consists of 2 parts :*
   - *Part-I : Electrical*
   - *Part-II : Aptitude*
2. *Each question carry equal marks.*
3. *There is no negative marking.*

PART I : ELECTRICAL

1. Kirchhoff's laws are not applicable to circuits with
   (a) distributed parameters
   (b) lumped parameters
   (c) passive elements
   (d) non-linear resistances
2. The force experienced by a current carrying conductor lying parallel to a magnetic field is
   (a) zero (b) BIl
   (c) $BIl \sin\theta$ (d) $BIl \cos\theta$
3. If a straight conductor of circular cross-section carries a current, then
   (a) no force acts on the conductor at any point.
   (b) an axial force acts on the conductor tending to increase its length.
   (c) a radial force acts towards the axis tending to reduce its cross-section.
   (d) a radial force acts away from the axis tending to increase its cross-section.
4. The magnetic reluctance of a magnetic circuit decreases with
   (a) decrease in cross-sectional area.
   (b) increase in cross-sectional area.
   (c) increase in length of magnetic path.
   (d) decrease in relative permeability of the magnetic material of the circuit.
5. The direction of dynamically induced emf in a conductor can be determined by
   (a) Fleming's left hand rule.
   (b) Fleming's right hand rule.
   (c) Helix rule.
   (d) Cork screw rule.
6. Principle of statically induced emf is used in
   (a) transformer (b) motor
   (c) generator (d) battery
7. Lower the self inductance of a coil
   (a) more will be the weber-turns.
   (b) more will be the emf induced.
   (c) lesser the flux produced by it.
   (d) smaller the delay in establishing steady current through it.
8. Average value of an unsymmetrical alltecrating quantity is calculated over the
   (a) whole cycle
   (b) half cycle
   (c) unsymmetrical part of the waveform
   (d) none of these
9. Carbon brushes are used in electric motors to
   (a) prevent sparking during commutation
   (b) provide a path for flow of current
   (c) brush off carbon deposits on the commutator
   (d) none of these
10. Under constant load condition, the speed of a dc motor is affected by
    (a) field flux alone
    (b) armature current alone
    (c) back emf
    (d) both armature current and field flux
11. DC motors are considered most suitable for the applications in
    (a) fans (b) water pumps
    (c) traction (d) flour mills
12. If 220 V dc series motor is connected to a 220 V ac supply, then at will
    (a) not run
    (b) burn out
    (c) run smoothly
    (d) run with less efficiency and high sparking
13. If the back emf of a dc motor suddenly vanishes
    (a) the motor will run faster
    (b) the motor will start hunting
    (c) the efficiency of the motor will increase
    (d) the motor will burn out

14. Torque of a motor is
(a) force in N-m acting on the rotor
(b) product of tangential force on the rotor and its radius
(c) the electrical power in kW
(d) power given to the load

15. Two dc series motors connected in series are driving the same mechanical load. If now the motors are connected in parallel, the speed becomes
(a) slightly more than double
(b) slightly less than double
(c) slightly more than half
(d) slightly less than half

16. Speed regulation of a d.c. motor can be ideally achieved with
(a) no excitation to the field of the motor
(b) constant excitation to the field of the motor
(c) variable excitation to the field of the motor
(d) A.C. excitation to the field of the motor

17. Which of the following type of dc generator gives constant output voltage at all loads ?
(a) shunt generator
(b) series generator
(c) shot shunt compound generator
(d) level compound generator

18. Equilizer ring in the lap winding of d.c. generator are used to
(a) avoid overhang
(b) avoid noise
(c) avoid harmonics
(d) avoid unequal distribution of current at brushes

19. A transformer provides a path for magnetic flux of
(a) high conductivity (b) high reluctance
(c) low reluctance (d) low conductivity

20. Transformer oil used in tranformer provides
(a) insulation and cooling
(b) cooling and lubrication
(c) lubricaiton and insulation
(d) insulation, cooling and lubrication

21. Eddy current losses in a transformer core may be reduced by
(a) reducing the thickness of aminations
(b) increasing the thickness of aminations
(c) increasing the air gap in the magnetic circuit
(d) reducing the air gap in the magnetic circuit

22. Highest rating tranformers are likely to find application in
(a) distribution (b) generation
(c) substation (d) transmission

23. Compared with the secondary of a loaded step-up transformer, the primary has
(a) lower voltage and higher current
(b) higher voltage and lower current
(c) lower voltage and lower current
(d) higher voltage and higher current

24. In a transformer, at every instant, the direction of the secondary current is such as to oppose any change of flux. This is as per
(a) Lenz's law (b) Faraday's law
(c) Coulomb's law (d) Ampere's law

25. Stepped core limbs are used to
(a) reduce iron material and iron losses
(b) reduce copper material and copper losses
(c) both (a) and (b)
(d) increase mechanical strength of the core

26. For short circuit and open circuit tests of a transformer, the instruments are connected on
(a) LV side and HV side respectively
(b) HV side and LV side respectively
(c) HV side only
(d) LV side only

27. Two transformers operating in pararllel share the load depending on their
(a) efficiency (b) rating
(c) leakage reactance (d) per unit impedance

28. In an autotransformer, power is transferred through
(a) conduction process alone
(b) induction process alone
(c) both conduction and induction processes
(d) mutual coupling

29. The main advantage of an auto-transformer over a two winding transformer is that
(a) uses only one winding
(b) core losses are reduced
(c) it needs no cooling
(d) it has simple construction

30. In an induction motor, rotor runs at a speed.
(a) equal to the speed of stator field
(b) lower than the speed of stator field
(c) higher than the speed of stator field
(d) having no relation with the speed of stator field

31. Wattmeter reading in no load test of induction motor gives
(a) copper losses in the stator
(b) friction and winding losses
(c) sum of (a) and (b) above
(d) total losses in the rotor on no load

32. If in a 3-phase induction motor, two phases open accidently, the motor will
(a) run at dangerously high speed
(b) stop
(c) continue to run depending on load
(d) none of these

33. Cogging of motor implies that motor
(a) runs at very low speed
(b) runs at low speed and then stops
(c) refuses to start at no load
(d) refuses to start at load

34. The drive generally used for lathe machines are
(a) squirrel cage induction motors
(b) synchronous motors
(c) slip ring induction motors
(d) dc shunt motors

35. Which of the following single phase motors is cheapest?
(a) Capacitor start motor
(b) Capacitor run motor
(c) Reluctance motor
(d) All have almost the same cost

36. Which of the following single phase motors is relaively free from mechanical and magnetic vibration?
(a) Reluctance motor (b) Hysteresis motor
(c) Universal motor (d) Shaded pole motor

37. A capacitor start single phase induction motor will usually have power factor of
(a) unity (b) 0.6 leading
(c) 0.8 leading (d) 0.6 lagging

38. Cylindrical rotor alternators have
(a) large length to diameter ratio
(b) small length to diameter ratio
(c) vertical configuration
(d) none of these

39. In an alternator, in order to reduce the harmonics in the generated emf
(a) slots are skewed
(b) salient pole tips are changed
(c) winding is made well distributed
(d) all of these

40. In a synchronous alternator, the frequency f in Hz is given by
(a) $f = \frac{PN}{120}$ (b) $f = \frac{PN}{60}$ (c) $f = \frac{PN}{60N}$ (d) $f = \frac{PN}{60P}$

41. Two batteries have an open-circuit voltage of 12.8 volts each and an internal resistance of 0.08 ohms. The short circuit current of two batteries connected in parallel will be
(a) 80 A (b) 120 A (c) 160 A (d) 320 A

42. The tolerance for silver stripe is
(a) +5% (b) +10% (c) ±5% (d) ±10%

43. Which of the following can have positive or negative charge?
(a) Electron (b) Iron (c) Hole (d) Neutron

44. Which of the following parallel resistances will have the highest value of equivalent resistance?
(a) 10 kohm and 25 kohm
(b) 1 kohm, 2 kohm and 3 kohm
(c) Two 500 kohm resistors
(d) Four 40 kohm and two 10 kohm resistors.

45. The resistance of a 150-scale voltmeter is 12000 ohms. The power consumed by the voltmeter when it is connected across a 125 volt circuit, will be nearly
(a) 0.0013 W (b) 0.013 W (c) 0.13 W (d) 1.3 W

46. Materials having electrical conductivity much less than most of the metals but much greater than that of typical insulators, are known as
(a) thermistors (b) varistors
(c) semi-conductors (d) variable resistors

47. Which of the following is usually not the generating voltage ?
(a) 6.6 kV (b) 9.9 kV
(c) 11kV (d) 13.2 kV

48. Which of the following is not the distribution system normally used
(a) 3 phase-4 wire (b) 3 phase-3 wire
(c) Single phase - 3 wire (d) Single phase -4 wire

49. Conductors for high voltage transmission lines are suspended from towers
(a) to reduce clearance from ground
(b) to increase clearance from ground
(c) to reduce wind and snow loads
(d) to take care of extension in length during summer.

50. When alternating current passes through a conductor
(a) it remains uniformly distributed throughout the section of conductor
(b) portion of conductor near the surface carries more current as compared to the core
(c) portion of conductor near the surface carries less current as compared to the core
(d) entire current passes through the core of the conductor.

51. The fact that a conductor carries more current on the surface as compared to core, is known as
(a) skin effect (b) corona
(c) permeability (d) unsymmetrical fault

52. Skin effect results in
(a) reduced effective resistance but increased effective internal reactance of the conductor
(b) increased effective resistance but reduced effective internal reactance of. the conductor
(c) reduced effective resistance as well as effective internal reactance
(d) increased effective resistance as well as effective internal reactance.

53. A capacitor start single phase induction motor will usually have a power factor of
(a) unity (b) 0.8 leading
(c) 0.6 leading (d) 0.6 lagging

54. A capacitor start, capacitor run single phase induction motor is basically a
(a) ac series motor
(b) dc series motor
(c) 2 phase induction motor
(d) 3 phase induction motor

55. The starting torque of a capacitor start motor is
(a) zero (b) low
(c) same as rated torque (d) more than rated torque

56. A load curve is a plot of
(a) Load versus generation capacity
(b) Load versus current
(c) Load versus time
(d) Load versus cost of power

57. The unit of conductance is
(a) per ohm (b) ohm/m (c) mho/m (d) mho

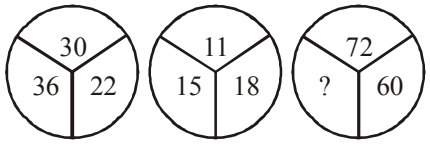
58. Ohm's law is not applicable in all the following cases except
(a) Electrolysis (b) Arc lamps
(c) Insulators (d) Vacuum radio valves.

59. The unit of conductivity is
(a) mho / m (b) mho / sq. m
(c) ohm / m (d) ohm / sq. m

60. According to Joule law heat produced by a current I while in flowing through a material of resistance R for a length of time T, is proportional to
(a) T only (b) (RT) (c) (IRT) (d) (I2RT)

PART II : APTITUDE

61. The missing number in the given figure is:



(a) 44 (b) 48
(c) 40 (d) 50

62. What is 30% of 450?
(a) 150 (b) 135 (c) 180 (d) 1350

63. Ten men can finish construction of a wall in eight days. How much men are needed to finish the work in half-a-day?
(a) 80 (c) 100 (b) 120 (d) 160

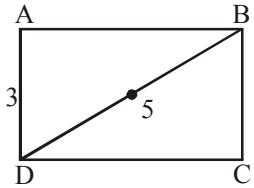
64. Find the next number in the series. 1, 2, 9, 28, 65, _____
(a) 126 (b) 182 (c) 196 (d) 245

65. A shop gives 10% discount on the purchase of an item. If paid for in cash immediately, a further discount of 12% is given. If the original price of the item is ₹250, what is the price of the article if a cash purchase is made?
(a) ₹200 (b) ₹195
(c) ₹198 (d) ₹190

66. It was Wednesday on July 15, 1964. What was the day on July 15, 1965?
(a) Thursday (b) Tuesday
(c) Friday (d) None of these

67. The average of $x_1\ x_2\ x_3$ and x_4 is 16. Half the sum of $x_2 x_3 x_4$ is 23. What is the value of x_1?
(a) 18 (b) 19
(c) 20 (d) 17

68. What is the perimeter of the rectangle ABCD when AD = 3 and BD = 5 (Shown in figure)



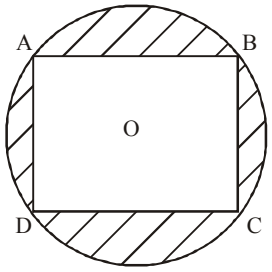
(a) 12 (b) 14 (c) 16 (d) 18

69. If March 1 of a leap year fell three days after Friday, what day of the week will be on November 22?
(a) Saturday (b) Sunday
(c) Thursday (d) None of these

70. The radius of the pool in a South Delhi Club is twice the radius of the pool in a North Delhi Club. The area of the pool in South Delhi Club is how many times the area of pool in the North Delhi Club?
(a) $\frac{1}{4}$ (b) $\frac{1}{2}$
(c) 2 (d) 4

71. How is $\frac{1}{2}$% expressed as a decimal fraction?
(a) 0.5 (b) 0.05
(c) 0.005 (d) 0.0005

72. A circle is circumscribed around a square (shown in figure). The area of one of the four shaded portions is equal to $\frac{7}{4}$. The radius of the circle is:



(a) 3 (b) 2
(c) $\sqrt{2}$ (d) $\frac{1}{\sqrt{2}}$

73. Find the next number in the series : 235, 346, 457 .....
(a) 578 (b) 568
(c) 468 (d) 558

74. A sofa set carrying a sale-price ticket of ₹5,000 is sold at a discount of 4%, thereby the trader earns a profit of 20%. The trader's cost price of the sofa set is:
(a) ₹4,200 (b) ₹4,000
(c) ₹3,600 (d) ₹3,800

75. A man was traveling on a mtorcycle at the speed of 50 km/h for $2\frac{1}{2}$ hour. Then a car full of youngster overtake him at a speed of 80 km/h. To overtake them he increased his speed to 70 km/h, but he could not overtake the car even after $2\frac{1}{2}$ hour. How far did he travel in the total time of 4 hours?
(a) 200 km (b) 230 km (c) 250 km (d) 300 km

76. How is $\frac{3}{4}$ expressed as percentage?
(a) 0.75% (b) 60% (c) 75% (d) 7.5%

77. There are two urns, one containing two white balls and four black balls, the other containing three white balls and nine black balls. One ball each is drawn out of the two urns. What is the probability of getting two balls of the same colour?
(a) $\frac{7}{12}$ (b) $\frac{1}{24}$ (c) $\frac{1}{12}$ (d) $\frac{1}{12}$

78. The perimeter of a rectangle is 60 metres. If its length is twice its breadth, then its area is:
(a) 200 m^2 (b) 180 m^2 (c) 160 m^2 (d) 220 m^2

79. In a class there are two sections A and B. If 10 students of section B shift over to section A, the strength of A becomes three times the strength of B. But if 10 students shift over from A to B, both A and B become equal in strength. How many students are there in sections A and B?
(a) 50 and 30 (b) 45 and 15 (c) 90 and 40 (d) 80 and 40

80. Which of the following is the smallest?
(a) $\frac{15}{16}$ (b) $\frac{16}{6}$
(c) $\frac{7}{8}$ (d) $\frac{11}{12}$

81. Bharat Nirman Scheme of the UPA Government does not include:
(a) Rural Water Supply Project
(b) Irrigation Benefit Programme
(c) Rural Electrification
(d) Sarva Shiksha Abhiyan

82. Which one of the following committee recommended the abolition of reservation of items for the small scale sector in industry?
(a) Abid Hussain Committee
(b) Narasimhan Committee
(c) Nayak Committee
(d) Rakesh Mohan Committee

83. In the last one decade which one among the following sectors has attracted the highest Foreign Direct Investment inflows into India?
(a) Chemicals other than fertilizers
(b) Services sector
(c) Food Processing
(d) Telecommunication

84. Who formulates the monetary policy in India?
(a) SEBI (b) RBI
(c) Finance Ministry (d) Planning Commission

85. The population of Uttar Pradesh has been rapidly growing during the last two decades because of:
(a) Increased literacy rate
(b) Improvement in health and control of diseases
(c) Improved agriculture
(d) Rapid urbanization

86. Recently Dargah Muinuddin Chisti at Ajmer was in news due to visit of Pakistani Prime Minister Dargah Muinuddin Chisti at Ajmer was built by:
(a) Qutubuddin Aibak (b) Alauddin Khilji
(c) IItutmish (d) Khijra Khan

87. Six more Public Sector Undertakings have been accorded status of miniratna by Government of India (September 2006). Choose the one which is not included amongst them from the following:
(a) Bharat Sanchar Nigam
(b) Indian Telephone Industries
(c) Hindustan Latex
(d) Rashtriya Ispat

88. In Union Budget 2013-14, "Voluntary Compliance Encouragement Scheme" was launched by Government of India. This scheme is related to:
(a) Service Tax (b) Commodity Transaction Tax
(c) Income Tax (d) Securities Transaction Tax

89. Which one of the following propounded that destiny determines everything, man is powerless?
(a) Jainas (b) Buddhists
(c) Ajivakas (d) Mimansakas

90. Lord Buddha preached the following four noble truths. Put them in correct order using the code given below:
(a) There is suffering.
(b) There is cessation of suffering.
(c) There is a path leading to the cessation of suffering.
(d) There is cause of suffering.
Codes:
(a) a, d, b, c (b) a, d, c, b
(c) a, c, b, d (d) a, b, d, c

91. Sheikh Nizamuddin Auliya was the disciple of:
(a) Sheikh Alauddin Sabir
(b) Khwaja Moinuddin Chisti
(c) Baba Farid
(d) Sheikh Ahmad Sirhindi

92. Which one of the following was favoured by Nehru but not favoured by Gandhiji?
(a) Truth (b) Non-violence
(c) Untouchability (d) Heavy industrialisation

93. The present deputy chairman of Rajya Sabha is elected member of Parliament from which State of India?
(a) Andhra Pradesh (b) Tamilnadu
(c) Kerala (d) Karnataka

94. Ashtadhayi was written by :
(a) Vedavyas (b) Panini
(c) Shukadeva (d) Balmiki

95. Adi Shankaracharya established four mathas. These mathas are situated at:
(a) Sringeri, Dwarka, Joshimath, Prayab
(b) Dwarka, Joshimath, Prayag, Kanchi
(c) Joshimath, Dwarka, Puri, Sringeri
(d) Purl, Sringerl, Dwarka, Varanasi

96. Who was the founder of 'Servants of India Society'?
(a) Madan Mohan Malviya
(b) Sarojini Naidu
(c) Justice Ranade
(d) Gopal Krishna Gokhale

97. The third Sangam was held at :
(a) Arrikkamedu (b) Emakulam
(c) Madurai (d) Tuticorin

98. Who among the following was the founder of the 'Satya Shodhak Samaj'?
(a) Dr. B.R.Ambedkar (b) Jyotiba Phule
(c) Narayan Guru (d) Ramaswamy Naicker

99. Cotton for textile was first cultivated in:
(a) Egypt (b) Mesopotamia
(c) Central America (d) India

100. As per election commission of India, how many recognized national political parties are there in India?
(a) 6 (b) 2
(c) 7 (d) None of these

Directions (101- 105) : In the following questions, groups of four words are given. In each group one word is wrongly spelt. Find the wrongly spelt word and mark your answer in the answer sheet.

101. (a) Preposterous (b) Disasterous
(c) Murderous (d) Onerous

102. (a) Severity (b) Cruelity
(c) Sincerity (d) Superiority

103. (a) Begining (b) Winning
(c) Mining (d) Running

104. (a) Complement (b) Compliment
(c) Supplement (d) Requirement

105. (a) Amelirate (b) Zealot
(c) Penetrate (d) Stain

Directions (Qs. 106-115) : In the following questions, a part of the sentence is printed in bold. Below are given alternatives to the bold part as (a), (b) and (c) which may improve the sentence. Choose the correct alternative. In case no improvement is needed, you answer is (d). Blacken the appropriate rectangle in the answer sheet.

106. She teaches us grammar, **isn't it?**
(a) isn't she? (b) doesn't she?
(c) doesn't it? (d) no improvement

107. The struggle for independent is gaining **movement** every day.
(a) motion (b) movement
(c) momentum (d) no improvement

108. She is quite without **affection** and has no false pride.
(a) admiration (b) affliction
(c) affectation (d) no improvement

109. I complimented Raju **for** his promotion.
(a) with (b) on
(c) about (d) no improvement

110. The food tastes **deliciously**.
(a) delicacy (b) delicious
(c) badly (d) no improvement

111. I have seen **much** of the plays of Shakespeare acted.
(a) a few (b) many
(c) most (d) no improvement

112. I **have bought** this house in 1970 for ₹. Twolakhs.
(a) had bought (b) bought
(c) have been bought (d) no improvement

113. Th child died **from** jaundice.
(a) with (b) of
(c) by (d) no improvement

114. I will phone you **after I shall arrive.**
(a) after I shall have arrived
(b) after I arrive
(c) after I arrived
(d) no improvement

115. It's high time you **come** to a decision.
(a) came (b) had come
(c) have come (d) no improvement

Directions (116- 120) : In the following questions, a sentence has been given in Active/Passive Voice. Out of the four alternatives suggested below, select the one which best expresses the same sentence in Passive/Active Voice.

116. You surprise me.
(a) I am to be surprised
(b) You are surprised
(c) I am surprised
(d) Me is surprised

117. The boys killed the snake with a stick.
(a) The snake was killed by the boys with a stick.
(b) A stick was killed by the boys with a snake.
(c) A snake with a stick was killed by the boys.
(d) A snake is killed by the boys with a stick.

118. Let me do this.
(a) Let us do this.
(b) This be done by me
(c) Let this be done by me
(d) Let do this

119. The tiger caught a fox.
(a) A fox has been caught by the tiger.
(b) A fox was caught by the tiger.
(c) A fox is caught by the tiger.
(d) A fox had been caught by the tiger.

120. Someone has lit the fire.
(a) The fire was lit by someone.
(b) You are requested to light the fire by someone.
(c) The firs has been lit by someone.
(d) The fire had been lit by someone.

ANSWER KEY

1	(a)	16	(b)	31	(d)	46	(c)	61	(a)	76	(c)	91	(c)	106	(b)
2	(a)	17	(d)	32	(c)	47	(b)	62	(d)	77	(a)	92	(d)	107	(c)
3	(c)	18	(d)	33	(c)	48	(d)	63	(d)	78	(a)	93	(c)	108	(c)
4	(b)	19	(c)	34	(a)	49	(b)	64	(a)	79	(a)	94	(b)	109	(b)
5	(b)	20	(a)	35	(a)	50	(b)	65	(c)	80	(c)	95	(c)	110	(d)
6	(a)	21	(a)	36	(b)	51	(a)	66	(a)	81	(d)	96	(d)	111	(b)
7	(d)	22	(b)	37	(d)	52	(b)	67	(a)	82	(a)	97	(c)	112	(b)
8	(a)	23	(a)	38	(a)	53	(d)	68	(b)	83	(d)	98	(b)	113	(b)
9	(b)	24	(a)	39	(d)	54	(c)	69	(d)	84	(b)	99	(d)	114	(b)
10	(a)	25	(b)	40	(a)	55	(b)	70	(d)	85	(d)	100	(a)	115	(a)
11	(c)	26	(b)	41	(d)	56	(c)	71	(c)	86	(b)	101	(b)	116	(c)
12	(d)	27	(d)	42	(d)	57	(d)	72	(c)	87	(b)	102	(b)	117	(a)
13	(d)	28	(c)	43	(b)	58	(c)	73	(b)	88	(a)	103	(a)	118	(b)
14	(b)	29	(a)	44	(c)	59	(a)	74	(b)	89	(c)	104	(d)	119	(b)
15	(a)	30	(b)	45	(d)	60	(d)	75	(b)	90	(a)	105	(a)	120	(c)

Delhi Metro Rail Corporation

JUNIOR ENGINEER (ELECTRICAL) RECRUITMENT EXAM-2012

Time : 90 min. | **[Based on Memory]** | **Max. Marks : 120**

Instructions

1. *This question paper consists of 2 parts :*
   - *Part-I : Aptitude*
   - *Part-II : Electrical*
2. *Each question carry equal marks.*
3. *There is no negative marking.*

PART I : APTITUDE

1. Hajo, the meeting point of Buddhism, Hinduism and Islam, is in the state of:
   (a) Bihar (b) Jharkhand
   (c) Uttar Pradesh (d) Assam
2. Which is the highest mountain peak in India?
   (a) K2 (b) Mount Everest
   (c) Kanchen Junga (d) Nanda Devi
3. Who amongst the following introduced the 'Doctrine of Lapse' whereby in absence of natural heir, the sovereignty of Indian States was to lapse to the British?
   (a) Lord Hardinge (b) Lord William Bentinck
   (c) Lord Dalhousie (d) Lord Hastings
4. A bottle filled with water at 30°C when opened at moon:
   (a) Water will freeze (b) Water will decomose
   (c) Water will boil (d) Nothing will happen
5. Which one of the following increases the blood calcium level in the human body?
   (a) Calcitonin (b) Parathormone
   (c) Thyroxin (d) Vasopressin
6. In India proclamation of emergency is made under:
   (a) Article 352 (b) Article 356
   (c) Article 359 (d) Article 360
7. Malaria can be detected by testing the blood for the presence of:
   (a) Eggs of mosquito in red blood cells
   (b) Plasmodium in red blood cells
   (c) Ruptured liver cells in blood
   (d) Larvae of mosquito in blood
8. How much would a 70 kg man weigh on the moon?
   (a) 14 kg (b) 114.1 newtons
   (c) 421.67 kg (d) 98.4 newtons
9. Smallest & largest planet of solar system is respectively:
   (a) Mercury & Uranus (b) Neptune & Jupiter
   (c) Mars & Saturn (d) Mercury & Jupiter
10. The MOTTO of the National Defence Academy is:
   (a) Sewa Parmo Dharma
   (b) Veerta Aur Vivek
   (c) Kartavya Sarvopari
   (d) None of these
11. Buddhism has been divided into how many sects:
   (a) Four (b) Two
   (c) Nine (d) Three
12. The term cox is associated with which game?
   (a) Rowing (b) Billiards
   (c) Golf (d) Boxing
13. The white band in India's national flag was added by:
   (a) Pt. Motilal Nehru
   (b) Pt. Jawahar Lal Nehru
   (c) Mahatma Gandhi
   (d) Rabindra Nath Tagore
14. If a new state of the Indian Union is to be created, which one of the following schedules of constitution must be amended?
   (a) First (b) Second
   (c) Third (d) Fifth
15. An order of the Supreme Court or High Court commanding a person or a body to do that which is his duty to do is known as:
   (a) Mandamus (b) Certiorari
   (c) Obiter Dictum (d) Quo Warranto
16. Food is supplied to the foetus by means of:
   (a) The mothers heart (b) The uterus
   (c) The placenta (d) The amniotic sac

17. How many languages have been recognized by the Indian Constitution now?
(a) 18 (b) 22
(c) 23 (d) None of these

18. In the epic Mahabharata, who was the archery teacher of both Pandavas and Kauravas:
(a) Dronocharya (b) Kripacharya
(c) Vishwamitra (d) Vashihtha

19. Anusuya, who gave sermons to Sita, the wife of Lord Rama, during their banishment to forest (vanvasa), was the wife of sage:
(a) Atri (b) Angiras
(c) Marichi (d) Kratu

20. Zero degree absolute is equivalent to:
(a) 0°C (b) 273°C
(c) –273°C (d) None of these

21. Identify the ATS Chief among the followings who lost their life during terrorist strike at Mumbai on 26-11-2008:
(a) Vijay Salaskar (b) Ashok Kampte
(c) Hemant Karkare (d) M. C. Sharma

22. In case of reflection it is well known that when a mirror turned through an angle the reflected ray turns through:
(a) Same angle (b) Twice the angle
(c) Thrice the angle (d) Half the angle

23. Transmission of light in fiber optics relies on the principle:
(a) Velocity of light is constant
(b) Refraction of light when light moves from a rarer to denser medium
(c) Total internal reflection
(d) Light travels in straight lines

24. Ankaleshwar in India is known for the production of:
(a) Bauxite (b) Coal
(c) Iron Ore (d) Petroleum

25. Which of the following pairs is not matched correctly?
(a) Laughing Gas : Nitrous Oxide
(b) Candy Fluid : Sodium Bicarbonate
(c) Muriatic Acid : Hydrochloric Acid
(d) Green Vitriol : Ferrous Sulphate

26. In a certain code EXERCISE is written as XEREICES. How is POSTPONE written in that code?
(a) OPSTOPEN (b) PSOPTNOE
(c) POTSOPEN (d) OPTSOPEN

27. Ram starts his journey from X point. There are seven cricketers who are standing in straight line in the North from X point. The gap between each cricketers is 3 km. The last player is M. S. Dhoni. The first player is Rahul Dravid who is standing at 3 km from X point. Now starting from X point Ram travels 10 km towards North and turns left and travels 4 km and then again turns right and covers another 5 km and then turns right and travels another 4 km. If Ram met M.S. Dhoni, how many km he covered?
(a) 21 km. (b) 25 km.
(c) 29 km. (d) None of these

28. If all the letters in the English alphabet are written in reverse order, which letter is exactly in the middle of 20th letter from right and 21st letter from left?
(a) O (b) N
(c) M (d) None of these

DIRECTIONS (Qs. 29 to 31) : *Read the following information carefully and answer the questions given below.*

There are six children P, Q, R, S, T and U playing squash. P and T are brothers. U is the sister of T. R is only son of P's uncle. Q and S are daughters of the only brother of R's father.

29. How is R related to U?
(a) Brother (b) Cousin
(c) Uncle (d) None of these

30. How many male players are there?
(a) Two (b) Three
(c) One (d) Four

31. How many female players are there?
(a) Three (b) Four
(c) Two (d) One

DIRECTIONS(Qs. 32-34) : *Read the following information and answer the questions that follow.*

In Common Wealth Games, six weightlifters were selected through a rigourous selection test. Their names are Atul, Bimal, Chintoo, Debu, Eshan and Fakir. Out of them Bimal, Chintoo and Eshan were from Rural Backround and the remaining from urban background. Atul, Bimal and Debu had completed their education in English medium and all remaining in Hindi Medium. Debu and fakir had specialisation in yoga and others had specialisation in swimming.

32. If Atul and Chintoo were also yoga specialists, what would have been the number of swimming specialist from rural background:
(a) 1 (b) 2
(c) 3 (d) None of these

33. Which of the following description is correct in respect of Atul and Bimal both of them are:
(a) From urban background studied in English medium
(b) From rural background studied in English medium
(c) Having swimming specialisation studied in English medium
(d) English medium players but one of them is a yoga expert

34. Who among the following is a yoga specialist coming form urban background and studied in English medium?
(a) Fakir (b) Atul
(c) Chintoo (d) Debu

DIRECTIONS (Qs. 35 & 36) : *In questions given below, choose the word opposite in meaning to the given word.*

35. MORBID
(a) Healthy (b) Pleasant
(c) Frugal (d) Chaste

36. MAGNANIMOUS
(a) Small (b) Naive
(c) Selfish (d) Generous

DIRECTIONS (Qs. 37& 38) : *Choose the word which is similar in meaning as the word given in capitals.*

37. SAGACIOUS
(a) Clever (b) Strong
(c) Ridiculous (d) Obstinate

38. INTREPID
(a) Foolhardy (b) Obstinate
(c) Fearless (d) Contaminated

DIRECTIONS (Qs. 39 & 40) : *Pick out the most effective word from the given words to fill in the blank to make the sentence meaningfully complete.*

39. ..... financial and industrial relation problems the company has achieved good export orders:
(a) Through (b) Though
(c) During (d) Despite

40. How would you ..... your action to your senior officers so that they can support you:
(a) Justify (b) Define
(c) Deplore (d) Account

DIRECTIONS (Qs. 41 & 42) : *Choose the correct passive voice of the sentence given in the question.*

41. Should we not obey our parents?
(a) Should our parents not be obeyed by us?
(b) Should our parents be not obeyed by us?
(c) Shall our parents not be obeyed by us?
(d) Shall our parents be not obeyed by us?

42. Women like men to flatter them:
(a) Men are liked by those women who flatter them.
(b) Women like to be flattered by men.
(c) Men flatters women and liked by them
(d) Flattering men are liked by women.

43. If CIRCLE is coded as RICELC, then SQUARE will be codel as
(a) QSUERA (b) UQSAER
(c) QUSERA (d) UQSERA

44. Anand is older to Shashank but younger to Rohan. Dhanashree is younger to Seema but older to Rajshree. If Rajshree is older to Shashank, who among them is the oldest?
(a) Rohan
(b) Seema
(c) Dhanashree
(d) Cannot be determined

45. Mahesh walks 30 metres towards east. Then he turns to his right and walks 20 metres. Then again turning to his right, he walks 30 metres. How far and in which direction is he from his original position?
(a) 20 metres, north (b) 50 metres, south
(c) 50 metres, west (d) 20 metres, south

46. In a March past seven persons are standing in a row. Q is standing left to R but right to P. O is standing right to N and left to P. Similarly, S is standing right to R and left to T. Find out who is standing in the middle?
(a) P (b) R
(c) Q (d) O

47. On a shelf are placed six volumes side by side labelled ABCDEF. BCEF have green covers while others have yellow covers. ADB are new volumes while the rest are old volumes. ACB are law reports while the rest are medical extracts. Which two volumes are old medical extracts and have green covers?
(a) BC (b) CD
(c) CE (d) EF

48. Out of the options given select the option that fills the blanks in the series in the same order
aac _ bba _ cc _ baa _ cb _
(a) cabcb (b) acbac
(c) bacbc (d) bcacb

DIRECTIONS (Qs. 49 & 50) : *What will come in place of the question mark (?) in these questions?*

49. ?% of 180 = 81
(a) 22 (b) 45
(c) 35 (d) 450

50. $10^3 \times 10^{12} \times 1000 = ?$
(a) 10^{17} (b) 10^{19}
(c) 10.000×10^{15} (d) 10^{18}

51. A train running at the speed of 60 km/hr crosses a man running parallel to the track in 7 seconds. What is the length of the train?
(a) 110 metres (b) $116\frac{2}{3}$ metres
(c) 100 metres (d) Cannot be determined

52. A reduction of 20% in the price of salt enabled a purchaser to obtain 4 kg more for ₹ 100. The reduced price of salt per kg is
(a) ₹ 4 (b) ₹ 5
(c) ₹ 6.25 (d) ₹ 6.50

53. The area of the square which has the same perimeter as a rectangle whose length is 48 m and is 3 times its breadth is
(a) 1000 sqm (b) 1024 sqm
(c) 1600 sqm (d) 1042 sqm

54. What is the least number of square tiles required to pave the floor of a room 15 m 17 cm long and 9 m 2 cm broad?
(a) 840 (b) 841
(c) 820 (d) 814

55. In an examination, 70% of the candidates pass in English, 80% pass in Mathematics and 10% fail in both of these subjects. If 144 candidates pass in both, then the total number of candidates is
(a) 125 (b) 200
(c) 240 (d) 375

56. HCF and LCM of two numbers are 7 and 140 respectively. If the numbers are between 20 and 45, then the sum of the numbers is
(a) 70 (b) 77
(c) 63 (d) 56

57. Ratio of the incomes of A and B is 3 : 5 respectively and that of C and B is 9 : 7 respectively. If the difference between the incomes of A and C is ₹ 4,800, what is C's income?
(a) ₹ 2,700 (b) ₹ 9,000
(c) ₹ 11,000 (d) None of these

58. Sarita started a business investing ₹ 60,000. After 3 months Surekha joined her with ₹ 80,000. If the profit at the end of the year is ₹ 3780.50, then what is the difference in their shares of profit?
(a) ₹ 540 (b) ₹ 270
(c) ₹ 1,620 (d) None of these

59. The difference in the present ages of Yadav and Vinay is 24 years and their ages are in the ratio 3 : 7. What is the sum of their present ages?
(a) 48 years (b) 60 years
(c) 66 years (d) None of these

60. An article when sold for ₹ 1,169 earned 40% profit on the cost price. What is the cost price?
(a) ₹ 830 (b) ₹ 701.40
(c) ₹ 840 (d) None of these

PART II : ELECTRICAL

61. The ability of a material to remain magnetized after removal of the magnetizing force is known as
(a) Permeability (b) reluctance
(c) hysteresis (d) retentivity

62. When a solenoid is activated, the force that moves the plunger is-
(a) an electromagnetic field
(b) a permanent magnetic field
(c) varying voltage
(d) a steady current

63. Which of the following capacitors is polarized
(a) mica (b) ceramic
(c) plastic-film (d) electrolytic

64. In a series resonant band-pass filter, a lower value of Q results in
(a) a higher resonant frequency
(b) a smaller bandwidth
(c) a higher impedance
(d) a larger bandwidth

65. An RC differentiator acts as a
(a) low-pass filter (b) high-pass filter
(c) band-pass filter (d) band-stop filter

66. A balanced three-phase, 50 Hz voltage is applied to a 3 phase, 4 pole, induction motor. When the motor is delivering rated output, the slip is found to be 0.05. The speed of the rotor m.m.f. relative to the rotor structure is
(a) 1500 rpm (b) 1425 rpm
(c) 25 rpm (d) 75 rpm

67. A ceiling fan uses
(a) split-phase motor.
(b) capacitor start and capacitor run motor
(c) universal motor.
(d) capacitor start motor.

68. The drive motor used in a mixer-grinder is a
(a) dc motor.
(b) induction motor.
(c) synchronous motor.
(d) universal motor.

69. A 1 : 5 step-up transformer has 120V across the primary and 600 ohms resistance across the secondary. Assuming 100% efficiency, the primary current equals
(a) 0.2 Amp. (b) 5 Amps
(c) 10 Amps. (d) 20 Amps.

70. A 50 Hz, 3-phase induction motor has a full load speed of 1440 rpm. The number of poles of the motor are
(a) 4. (b) 6.
(c) 12 (d) 8.

71. In a 3-phase synchronous motor-
(a) the speed of stator MMF is always more than that of rotor MMF.
(b) the speed of stator MMF is always less than that of rotor MMF.
(c) the speed of stator MMF is synchronous speed while that of rotor MMF is zero
(d) rotor and stator MMF are stationary with respect to each other.

72. In a three phase transformer, if the primary side is connected in star and secondary side is connected in delta, what is the angle difference between phase voltage in the two cases.
(a) delta side lags by -30°.
(b) star side lags by -30°.
(c) delta side leads by 30°.
(d) star side leads by -30°.

73. Slip of the induction machine is 0.02 and the stator supply frequency is 50 Hz. What will be the frequency of the rotor induced emf?
(a) 10 Hz. (b) 50 Hz.
(c) 1 Hz. (d) 2500 Hz.

74. A 4 pole lap wound dc shunt motor rotates at the speed of 1500 rpm, has a flux of 0.4 mWb and the total number of conductors are 1000. What is the value of emf?
(a) 100 Volts. (b) 0.1 Volts.
(c) 1 Volts. (d) 10 Volts.

75. A 3 stack stepper motor with 12 numbers of rotor teeth has a step angle of _____.
(a) 120 (b) 8
(c) 24 (d) 10

76. Oil-filled cable has a working stress of _____ kV/mm
(a) 10 (b) 12
(c) 13 (d) 15

77. The rotor frequency for a 3 phase 1000 RPM 6 pole induction motor with a slip of 0.04 is_____Hz
(a) 8 (b) 4
(c) 6 (d) 2
Rotor frequency $f_r = s \times f = 0.04 \times 50 = 2.0$ Hz

78. The synchronous speed for a 3 phase 6-pole induction motor is 1200 rpm. If the number of poles is now reduced to 4 with the frequency remaining constant, the rotor speed with a slip of 5% will be _____.
(a) 1690 rpm (b) 1750 rpm
(c) 1500 rpm (d) 1710 rpm

79. The efficiency of a transformer is mainly dependent on
(a) core losses. (b) copper losses
(c) stray losses. (d) dielectric losses.

80. A synchronous motor is operating on no-load at unity power factor. If the field current is increased, power factor will become
(a) Leading & current will decrease
(b) Lagging & current will increase.
(c) Lagging & current will decrease
(d) Leading & current will increase.

81. A 220/440 V, 50 Hz, 5 KVA, single phase transformer operates on 220V, 40Hz supply with secondary winding open circuited. Then
(a) Both eddy current and hysteresis losses decreases.
(b) Both eddy current and hysteresis losses increases.
(c) Eddy current loss remains the same but hysteresis loss increases.
(d) Eddy current loss increases but hysteresis loss remains the same.

82. Electric ovens using heating elements of _____ can produce temperature upto 3000°C.
(a) Nickel (b) Graphite
(c) Chromium (d) Iron

83. Electric resistance seam welding uses _____ electrodes.
(a) Pointed (b) Disc.
(c) Flat (d) Domed

84. The line trap unit employed in carrier current relaying:
(a) offers high impedance to 50 Hz power frequency signal
(b) offers high impedance to carrier frequency signal
(c) offers low impedance to carrier frequency signal
(d) Both (A) & (C)

85. The temperature of resistance furnaces can be controlled by changing the:
(a) applied voltage
(b) number of heating elements
(c) circuit configuration
(d) All of the above

86. A single phase Hysteresis motor
(a) can run at synchronous speed only
(b) can run at sub synchronous speed only
(c) can run at synchronous and super synchronous speed
(d) can run at synchronous and sub synchronous speed

87. The armature of a dc machine is laminated to reduce:
(a) Eddy current loss (b) Hysteresis loss
(c) copper losses (d) friction and windage losses

88. For LV applications (below 1 kV), _____ cables are used.
(a) Paper insulated. (b) Plastic.
(c) Single core cables. (d) Oil filled.

89. An ideal constant current source is connected in series with an ideal constant voltage source. Considering together the combination will be a -
(a) constant voltage source
(b) constant current source
(c) constant voltage and a constant current source or a constant power source
(d) resistance

90. Which one of the following is not a transducer in the true sense?
(a) Thermocouple (b) Piezoelectric pick-up
(c) Photo voltaic cell (d) LCD

91. The coefficient of coupling between two air core coils depends on
(a) mutual inductance between two coils only
(b) self inductances of the two coils only
(c) mutual inductance and self inductances of the two coils
(d) none

92. The current from the stator of an alternator is taken out to the external load circuit through
(a) slip rings. (b) commutator segments.
(c) solid connections. (d) carbon brushes.

93. A motor which can conveniently be operated at lagging as well as leading power factors is the
(a) squirrel cage induction motor.
(b) wound rotor induction motor.
(c) synchronous motor.
(d) DC shunt motor.

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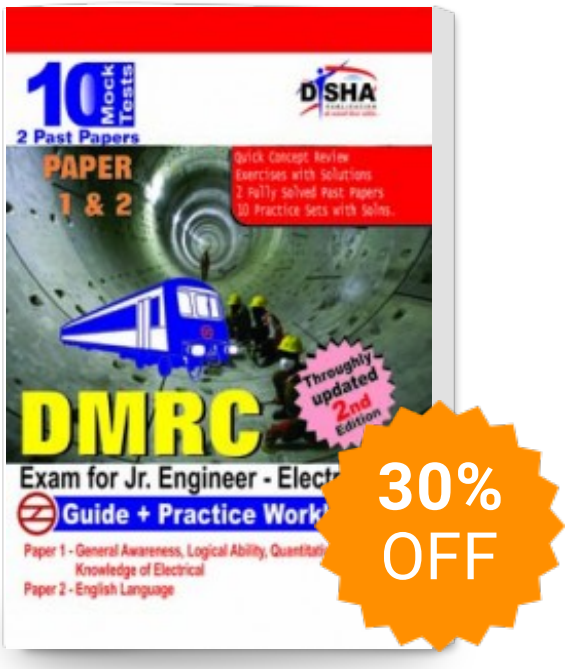

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