TECHNICAL SKILL TEST

Study Material in Brief Questions Form

(With Explanatory Answers)

1. The expresser breather-valve is controlled by . . .
2. Fuel injection pump can be separated by keeping . . . to zero.
3. Which device is used to measure the temperature of the furnace?
4. What is used to observe moisture in the distribution transformer?
5. What prevents loco braking when dynamic brake is applied?
6. To contain electrical fire, which type of fire extinguishers should be used?
7. What is used as refrigerant in A/C coaches?
8. . . . switches are replaced by *Toggle Switches*?
9. Which regulator can be used in all makes of alternator?
10. What is the *specific gravity* of the fully charged lead acid-cell?
11. What will be the effective resistance of two resistances of 10 ohms each connected in parallel?
12. What is the average life of a steel bodied coach?
13. The upper camber of under frame should be checked for what prescribed limit for mild steel under frame?
14. The upper camber of under frame should be checked for what prescribed limit for high tensile steel under frame?
15. What is the maximum permissible wear on route of the hook near the point of contact with screw coupling shackle?
16. Force acting between two *positive charges* will be . . .
17. The current passing through the galvanometer will be zero, when a Wheatstone Bridge is . . .
18. When the temperature of an . . . increases, the resistance usually decreases.
19. Which device works on the principle of wheatstone bridge?
20. Name the scientist who discovered the magnetic effect of current.
21. The . . . linked with a coil is directly proportional to. current.
22. Phenomenon of the production of an . . . in one coil when the current changes in another coil is called *mutual induction*.
23. Which law helps us determine the direction of Eddy current?
24. What is the mass of a *proton*?
25. What is mass number?
26. What is the total power in AM wave?
27. What is the total number of symbols used in decimal system?
28. What is the binary number equivalent to the decimal number 7?
29. The decimal number is . . . when it is converted into binary number.
30. *"In any network of conductors, the algebraic sum of the currents meeting at any point is zero"*. Which law states this?
31. Which device is used for measuring or comparing potential differences and also to measure any electrical quantity which can be converted into a proportionate DC?
32. In the process of . . . a liquid is decomposed into ions.
33. Which liquid conducts electricity and undergoes decomposition?
34. What are the two plates immersed in liquid and connected to a battery called?
35. Anodes are electrodes connected to . . . terminal.
36. Cathodes are electrodes connected to . . . terminal.
37. In which type of cell, the chemical reactions are reversible?
38. A magnetic field is defined as the space around the current . . .

39. What causes unwanted heating in transformers, motors and generators?
40. Why are the metal cores of electrical devises are laminated?
41. What is the function of a transformer?
42. The electrical device, transfomer, is based on which principle?
43. What is the function of a dynamo or a generator?
44. Which machine helps convert electrical energy into mechanical energy?
45. What is *mass*?
46. What is *weight*?
47. What is the unit of *force* in SI system?
48. What is the weight equivalent of 9.8 Newtons in grams?
49. The product of force and distance is called . . .
50. What is the unit of *work*?
51. What is the capacity for doing work known as?
52. Define potential energy.
53. Define kinetic energy.
54. Give an example of *first order of lever*.
55. Give an example of *second order of lever*.
56. Give an example of *third order of lever*.
57. Define density.
58. What is the unit of density in SI system?
59. What are indicated by thin and broken lines in engineering drawing?
60. What are indicated by thin and continuous lines in engineering drawing?
61. What are indicated by thin long chain lines in engineering drawing?
62. Define acute angle.
63. Define obtuse angle.
64. What is a straight angle?
65. What are reflex angles?
66. Define volume.
67. Define area.
68. What is a *Bit* in computer language?
69. What is a *Byte* in computer language?
70. What is *Data* in computer language?
71. What do Kb and Mb mean?
72. What is a *Program*?
73. What is *Software*?
74. What is called a *file*?
75. What is a *Monitor*?
76. Where do we use a *rivet*?
77. Where do we use a *bolt*?
78. What are *cotters* and *keys*?
79. What type of fastening is done by *brazing* and *welding*?
80. How is the *gusset stay* of a boiler mounted?
81. What is a *key*?
82. What is a *key way*?
83. What is a *cotter*?
84. How are the *shafts* joined?
85. Where do we use *bevel gear*?
86. What is a *jig*?
87. What are *fixtures*?
88. What is the permissible limit of *cross trammelling* of Bogie frame?
89. What is the permissible limit of *longitudinal trammelling* of Bogie frame?
90. What is the permissible limit of *Diagonal trammelling* of Bogie frame?
91. What is the advantage of low air pressure in a diesel locomotive?
92. Where is *orifice test* plate used?
93. Lube oil found in expansion tank will signify . . .
94. During *emergency braking*, the brake cylinder pressure could be . . .
95. How can we use an ammeter in D.C.?
96. What is the equivalent of 746 watts?
97. Where an AVO meter is used?
98. What could be used in place of fuse and switch?
99. Where do we use a rectifier?
100. Which device is used for conducting drop test?
101. Which gas is usedfor leak testing purpose?
102. Electric fire is put off by . . .
103. What is the voltage of a fully charged lead acid cell?
104. In storage battery, which acid is used?
105. Switch on off of the air condition plant in A/c coach is controlled by . . .
106. What is the function of a condenser?
107. What is the function of an expansion valve?
108. What is the dimension of the cable used in field circuit between alternator?
109. Which device is used to check up the condition of battery electrolyte?

110. Why are floats provided in storage battery?
111. Why crimping is done in the terminal joints?
112. In *TL wiring system*, what is the minimum insulation value?
113. Where do we use a multimeter?
114. Where do we use taper end shaft?
115. For bar frame welding which electrodes are recommended?
116. What is the function of pivot pin?
117. What causes pitting?
118. What indicates burning in roller bearing?
119. How is traction motor suspended on the axle?
120. The keys on the shafts are subjected to what kind of stress?
121. Horse power is proportional to . . .
122. What is HSS tool?
123. Where are slotting machines used?
124. Which lathe is used for boring in wheels shop?
125. What is the expansion of CNC in a CNC machine?
126. In which furnace is pig iron melted?
127. What is a *planing machine*?
128. What is a *slotting machine*?
129. What is the process of joining two pieces of metal called as?
130. What is broaching?
131. Which gases are used for cutting steel?
132. What is boring?
133. Which instrument is also called a linear instrument?
134. What is added to improve the machineability of a casting?
135. What is done to obtain a smooth and polish finish for a casting?
136. What is added to deoxidise molten bronze?
137. What are the metallurgical contents of cast iron?
138. What improves bonding strength during the white metalling process?
139. How can the hardness of brake blocks during chill casting be reduced?
140. Why do defects like *porosity* and *blow holes* occur in moulding?
141. What causes cold shut?
142. Switching over to chill casting from green sand mould will increase . . .
143. What helps avoid blow holed heads in casting?
144. What are the main constituents of white metal?
145. What is the contents of mould wash?
146. What is the drawback of semiconductor memory?
147. What is the conversion formula to get Fahrenheit degree from Centigrade degree?
148. What is the velocity of light?
149. What is the use of a barometer?
150. What is the least count of screw gauge?
151. What is a lap?
152. What helps hold light forging jobs?
153. In what type of furnace a light forging material is heated?
154. What is shore hardness?
155. What is a feeler gauge?
156. How is the correctness of *thread profile* of a bolt checked?
157. What is the ideal bore in an interference fit?
158. What should be the value of a perfect zero error in a micrometer?
159. How is the *internal diameter* of a hole measured?
160. What is honing?
161. Define velocity.
162. How are the front view and the top view placed in first angle projection?
163. What is case hardening?
164. What is the advantage of adopting Intermediate profile for wheels?
165. Why *Brinell's hardness test* is performed?
166. What is the primary stress in the key of a shaft?
167. Which steel is used in making the exhaust valves of the cylinder head of diesel engines?
168. How many degrees make one radian?
169. How can the internal stress of forged job be relieved?
170. What causes *primary stress* in a shaft?
171. What causes *primary stress* in a beam?

172. What determines the rigid-wheel base of a vehicle?
173. What is the basis of designing coil springs?
174. What is the percentage of carbon in class IV steel?
175. *Axles* and *shafts* are subjected to what kind of loads?
176. What is Hook's stress?
177. What is *Cooper*?
178. What is the function of *Vickers*?
179. Which threads are very closely similar?
180. Axles take . . ., transmit . . .
181. In what type of welding method the arc is covered under a blanket of granular flux?
182. What is cupola?
183. What type of lathes are used for turning?
184. Where do we use an Eicometer?
185. What does *pitted roller bearing's* inner race indicate?
186. How is the prescribed torquing of bolts and nuts achieved?
187. What is the function of a split pin?
188. Why are springs quenched in water?
189. What is meant by HRD?
190. What is the free height of Snubber spring?
191. How many rubber fittings are there in a vacuum cylinder?
192. What is the *free camber value* of tin plated bearing spring?
193. What is the value of the force acting on torque wrench for M-10 bolt?
194. What are *Kinks*?
195. What are *Slacks*?
196. What is the minimum oil level to be ensured before rivetting of an axle box fitted with lid?
197. What are the two types of welding processes?
198. What are the most common defects in welded joints?
199. What do *low hydrogen electrodes* require before use?
200. What is the melting point of steel?

Explanatory Answers

1. The expresser breather-valve is controlled by crank case.
2. Fuel injection pump can be separated by keeping rack to zero.
3. Thermocouple is used to measure the temperature of the furnace.
4. Silica gel is used to observe moisture in the distribution transformer.
5. Interlock valve prevents loco braking when dynamic brake is applied.
6. To safely contain electrical fire, Carbon dioxide fire extinguishers should be used.
7. *Freon - 12* is used as refrigerant in air- conditioned coaches.
8. Single pole tumbler switches are replaced by *Toggle Switches*.
9. Universal regulator can be used in all makes of alternator.
10. The *specific gravity* of the fully charged lead acid cell is 1220.
11. The effective resistance of two resistances of 10 ohms each connected in parallel will be five ohms.
12. The average life of a steel bodied coach is 25 years.
13. The *upper camber* of underframe should be checked for a limit of 25 mm. for mild steel underframe.
14. The *upper camber* of underframe should be checked for a limit of 12 mm. for high tensile steel under frame.
15. The maximum permissible wear on route of the hook near the point of contact with screw coupling shackle is 5 mm.
16. Force acting between two *positive charges*, will be repulsive.
17. The current passing through the galvanometer will be zero, when a Wheatstone Bridge is balanced.
18. When the temperature of an insulator increases, the resistance decreases.
19. Post office box works on the principle of wheatstone bridge.
20. The magnetic effect of current was discovered by Oersted.

21. The magnetic flux linked with a coil is directly proportional to current.
22. Phenomenon of the production of an electromotive force in one coil when the current changes in another coil is called *mutual induction*.
23. Lenz's law helps us determine the direction of Eddy current.
24. The mass of a *proton* is 1.67261×10^{-27} kg.
25. The sum of proton and neutron is called mass number.
26. The total power in AM wave is equal to $(E^2c/2R) \div \{(1+m^2a)/2\}$.
27. Totally ten number of symbols are used in decimal system.
28. The binary number equivalent to the decimal number 7 is 111.
29. The decimal number is repeatedly divided by 2 in the conversion of decimal number into binary number.
30. Kirchoff's law states that, *"In any network of conductors, the algebraic sum of the currents meeting at any point is zero"*.
31. *Potentiometer* is used for measuring or comparing potential differences and also to measure any electrical quantity which can be converted into a proportionate DC.
32. In the process of *electrolysis* a liquid is decomposed into ions.
33. Electrolyte conducts electricity and undergoes decomposition.
34. Electrodes are the two plates immersed in liquid and connected to a battery called?
35. *Anodes* are electrodes connected to *positive terminal*.
36. *Cathodes* are electrodes connected to *negative terminal*.
37. In secondary cell, the chemical reactions are reversible.
38. A magnetic field is defined as the space around the current carrying conductor.
39. Eddy current causes unwanted heating in transformers, motors and generators.
40. The metal cores of elec-trical devises are *laminated* to eliminate eddy current.
41. To convert low alternating voltage to high and high alternating voltage to low.
42. Principle of mutual induction between the coils.
43. To convert mechanical energy into direct current electrical energy.
44. An electric motor.
45. Mass is the quantity of matter contained in a body.
46. Weight is the force with which a body is attracted towards the centre of earth.
47. The unit of force in SI system is Newton.
48. Thousand grams or one kilogram.
49. The product of *force* and *distance* is called *work*.
50. Work is measured in Joules.
51. The capacity for doing work is called energy.
52. Potential energy is the energy possessed by a body due to its position.
53. Kinetic energy is the energy possessed by a body due to its motion.
54. Scissors is an example of *first order of lever*.
55. Nut cracker is an example of *second order of lever*.
56. Forceps is an example of *third order of lever*.
57. The mass contained in unit volume of a substance is called its density.
58. Unit of density in SI system is $kg./m^3$.
59. The dimensions of figures are indicated by thin and broken lines in engineering drawing.
60. Projection lines are drawn as thin and continuous lines in engineering drawing.
61. Centre lines are drawn as thin long chain lines in engineering drawing.
62. Angles measuring less than 90° are called acute angles.
63. Angles measuring less than 90° are called obtuse angles.
64. A straight angle is a straight equal to 180°.
65. Angles between180° and 360° are considered to be reflex angles.
66. The measure of space occupied by a body is called Its volume.
67. The extent of surface of a body is called its area.

68. A *Bit* is the abridged term of binary digit.
69. A fixed number of *Bits* that represents a charector is called a *Byte*.
70. *Data* is a collection of raw facts that is entered as input, processed and transformed into meaningful information.
71. 1 Kilobyte (Kb) is equal to 1024 Bytes, and 1 Megabyte (Mb) is equal to 1024 kilobytes.
72. A *program* is a series of step by step instructions that tells the computer what to do.
73. *Software* is a set of programs, documents, procedures and routines associated with the operation of a computer system.
74. A *File* is a collection of individual records that are treated as unit.
75. *Monitor* is the television like device used to display data.
76. In the event of a permanent fastening, rivetting is done.
77. In the event of a temporary fastening bolt is used.
78. Keys and cotters are means of temporary fastening .
79. Permanent fastening is done by *brazing* and *welding*.
80. In a boiler, the gusset stay is mounted by rivetting.
81. A piece inserted between the joint of two parts to prevent relative movement is called a key.
82. A recess in a job or hub to accommodate a key is called a key way.
83. Flat wedge like pieces of steel, used to fasten rods, are called cotters.
84. Shafts are joined by couplings and supported by bearings.
85. Bevel gear is used to transmit motion between two shafts when they intersect each other.
86. Jig is a guiding and holding tool.
87. Fixtures are the holding tools for a component while machining.
88. *Cross trammelling* of Bogie frame can have a permissible limit within 2 mm.
89. *Longitudional trammelling* of Bogie frame can have a permissible limit within 2 mm.
90. *Diagonal trammelling* of Bogie frame can have a permissible limit within 3 mm.
91. Low air pressure in a diesel locomotive will cost, low brake power and low vaccuum pressure.
92. *Orifice Test Plate* is used for testing when there is a low vaccuum in a diesel locomotive.
93. Presence of lube oil in *expansion tank* may be due to broken cooler tube.
94. The brake cylinder pressure raises between 4 and 4.5 kg/cm^2, when the driver applies emergency brake.
95. Ammeters are used in D.C. with shunt in series.
96. 1 Kw is equal to 746 watts.
97. We use AVO meter to measure current voltage and resistance.
98. Fuse and switch unit can be replaced by main circuit breaker.
99. To convert A.C. to D.C. a rectifier is employed.
100. Milli voltmeter is used for conducting drop test.
101. To put out electric fire, carbon dioxide type fire extinguisher is employed.
102. For leak testing purpose, nitrogen gas is used at 20 kg/cm^2.
103. A fully charged lead acid cell has a voltage of 2.4 Volt.
104. Sulphuric acid is used in storage battery.
105. Rotory switch is used to switch on and off the air condition plant in A/c coach.
106. A condenser is used for cooling hot gas and liquilying it under pressure.
107. To control and regulate the rate of flow of liquid refrigerant an expansion valve is used.
108. The cable used between alternator, in field circuit, is of 4 sq. mm. size.
109. To checkup the condition of battery electrolyte a hydrometer is used.
110. To measure the level of electrolyte, in a battery, floats are used.
111. To reduce loose connection in the terminal joints crimping is done.
112. The minimum insulation value in TL wiring system is 2 MΩ.
113. A multimeter is used to check diode and transistor.
114. Taper end shaft is used for matting purpose.

115. For bar frame welding the much recommended ones are *class* C electrodes.
116. In locomotive ABC coupler pivot pin connects hook to the buffer assembly.
117. Pitting is the result of passing of electric current through the roller bearing.
118. Burning in roller bearing is indicated by the blackening of grease.
119. Suspension bearing is employed to suspend traction motors on the axle.
120. The keys on the shafts are subjected to shear stress.
121. *Horse power* is proportional to voltage and RPM.
122. HSS stands for High Speed Steel.
123. To machine *keyways* in sleeves, a slotting machine is used.
124. In wheels shop vertical turret lathe is used for boring.
125. CNC stands for *Computerised Numerical Control* in CNC machine.
126. Blast furnace is employed to melt pig iron in foundry.
127. A *planing machine* is one in which tool is stationary and work is moving.
128. A *slotting machine* is one in which work is stationary and tool is moving.
129. *Welding* is the process of joining two pieces of metal.
130. *Broaching* is the process of making square holes in the M.S. bearing plate.
131. Oxygen and acetylene gases are used for cutting steel.
132. The process of enlarging a bore is known as *boring*.
133. *Vernier calipers* is called linear instrument.
134. To improve the machine-ability of a casting ferro silicon is added.
135. To obtain a *smooth* and *polished* finish for a casting graphite coating is applied.
136. Phosphor and copper are added to deoxidise molten bronze.
137. *Cast iron* contains iron, carbon, manganese, phosphorous and silicon.
138. Bonding strength, during the white metalling process, is improved by proper tinning.
139. The hardness of brake blocks during chill casting can be reduced by adding ferro silicon.
140. Defects like *porosity* and *blow holes* occur in moulding because of the presence of moisture.
141. *Lack of fluidity* in the molten metal causes the casting defect called cold shut.
142. Switching over to chill casting from *green sand mould* will increase addition of ferro manganese.
143. Proper venting avoids blow holed heads in casting.
144. Copper, antimony, lead and tin are the main constituents of white metal.
145. Graphite powder and water are the main contents of mould wash.
146. Volatility is the only draw-back of semiconductor memory.
147. Formula for conversion of Centigrade to Fahrenheit is $(C \times 9/5) + 32$.
148. Speed of light is 3×10^8m/s.
149. *Barometer* is used to measure atmospheric pressure.
150. Least count of screw gauge is 0.01 mm.
151. The metal fold on a forged job is called lap.
152. The holding of light forging job is done by tongs.
153. Heating of a light forging material is done in open hearth furnace.
154. Shore hardness is done on jobs like rubber .
155. A *feeler gauge* is called direct measuring instrument.
156. Correctness of thread profile of a bolt is checked by thread guage.
157. In an interference fit the bore should be less than the shaft diameter.
158. Zero error in a micrometer should be 0 to obtain actual measurement.
159. A bore dial guage and an inside micrometer are used for checking internal diameter of a hole.
160. Honing or boring is the process of expanding hole.
161. The distance travelled ÷ Time taken to travel is known as the velocity.
162. Top view is placed above the front view in first angle projection.
163. *Case hardening* is the process of inducting hardness by carbon.
164. Adoption of intermediate profile for wheels has the advantage of less friction.

165. *Brinell's hardness test* is adopted to check the hardness of a leaf spring plate after hardening before tempering.
166. Shear stress is the primary stress in the key of a shaft.
167. Exhaust valves of diesel engine cylinder head are made of tungsten steel.
168. One radian is equal to 57.3 degrees.
169. Normalising relieves internal stress of forged job.
170. Primary stress in a shaft is on account of *torsional load*.
171. Primary stress in a beam is on account of uniformly distributed load.
172. Rigid wheel base of a vehicle is determined by load pattern.
173. Coil springs are designed based on their compressive strength.
174. In class IV steel, carbon content is 0.4%.
175. Axles are predominantly subjected to *bending load* whereas shafts are subjected to *torsional load*.
176. Circumferential stress in a pressure vessel is Hook's stress.
177. Flexible coupling – *coopers* – takes care of misalignment of main crankshaft and expressor crankshaft of a diesel loco when connected.
178. Hardness of leaf spring plate is checked by *Vickers*.
179. BSW threads and UNC threads are quite alike.
180. Axles take tangential load besides transmitting torque.
181. The arc is always covered under a blanket of granular flux in submerged welding method .
182. Cast iron is normally produced in *Cupola furnace*.
183. Wood working lathes are used for *turning*.
184. *Eicometer* is used to measure the film thickness of paint.
185. Inner race of the pitted roller bearing indicates presence of foreign material.
186. A torque wrench is used to do prescribed torquing of bolts and nuts.
187. A split pin is used to achieve locking of a tightened bolt and nut.
188. Springs are quenched in water to increase hardness.
189. HRD is the abbreviation of *Hydraulic Rescue Device*.
190. The free height of *snubber spring* is 294.
191. In a vacuum cylinder there are in all 9 rubber fittings.
192. The *free camber* of tin plated bearing spring is 47 mm.
193. For M-10 bolt, the force acting on torque wrench is 11 to 12 kgm.
194. *Kinks* are the horizontal distortion of rails.
195. *Slacks* are the vertical distortion of rails.
196. It should be ensured that the minimum oil level is 25 mm, before rivetting of an axle box fitted with lid.
197. *Arc welding* and *gas welding* are the two types of welding processes.
198. Pores and cracks are the most commonly noticed defects in welded joints.
199. Proper heating is essential, for low hydrogen electrodes, before use.
200. Melting point of steel is about 2500 ° C.