

Booklet Series

A

Register Number

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2008

ELECTRICAL AND INSTRUMENTATION ENGINEERING

Time Allowed : 3 Hours]

[Maximum Marks : 300

Read the following instructions carefully before you begin to answer the questions.

IMPORTANT INSTRUCTIONS

- 1. This Booklet has a cover (this page) which should not be opened till the invigilator gives signal to open it at the commencement of the examination. As soon as the signal is received you should tear the right side of the booklet cover carefully to open the booklet. Then proceed to answer the questions.
2. This Question Booklet contains 200 questions.
3. Answer all questions. All questions carry equal marks.
4. The Test Booklet is printed in four series e.g. [A] [B] [C] or [D] (See Top left side of this page). The candidate has to indicate in the space provided in the Answer Sheet the series of the booklet. For example, if the candidate gets [A] series booklet, he/she has to indicate in the side 2 of the Answer Sheet with Blue or Black Ink Ball point pen as follows :

[A] [] [B] [C] [D]

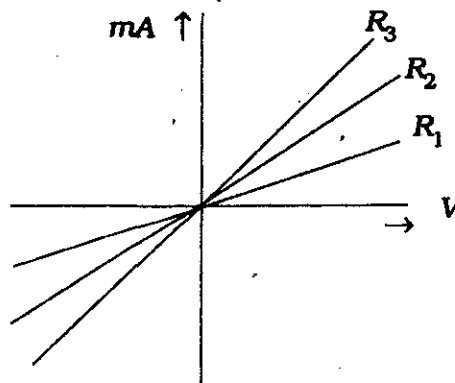
- 5. You must write your Register Number in the space provided on the top right side of this page. Do not write anything else on the Question Booklet.
6. An Answer Sheet will be supplied to you separately by the Invigilator to mark the answers. You must write your Name, Register No. and other particulars on side 1 of the Answer Sheet provided, failing which your Answer Sheet will not be evaluated.
7. You will also encode your Register Number, Subject Code etc., with Blue or Black ink Ball point pen in the space provided on the side 2 of the Answer Sheet. If you do not encode properly or fail to encode the above information, your Answer Sheet will not be evaluated.
8. Each question comprises four responses (A), (B), (C) and (D). You are to select ONLY ONE correct response and mark in your Answer Sheet. In case you feel that there are more than one correct response, mark the response which you consider the best. In any case, choose ONLY ONE response for each question. Your total marks will depend on the number of correct responses marked by you in the Answer Sheet.
9. In the Answer Sheet there are four brackets [A] [B] [C] and [D] against each question. To answer the questions you are to mark with Ball point pen ONLY ONE bracket of your choice for each question. Select one response for each question in the Question Booklet and mark in the Answer Sheet. If you mark more than one answer for one question, the answer will be treated as wrong. e.g. If for any item, (B) is the correct answer, you have to mark as follows :

[A] [] [C] [D]

- 10. You should not remove or tear off any sheet from this Question Booklet. You are not allowed to take this Question Booklet and the Answer Sheet out of the Examination Hall during the examination. After the examination is concluded, you must hand over your Answer Sheet to the Invigilator. You are allowed to take the Question Booklet with you only after the Examination is over.
11. Failure to comply with any of the above instructions will render you liable to such action or penalty as the Commission may decide at their discretion.
12. Do not tick-mark or mark the answers in the Question Booklet.
13. The sheet before the last page of the Question Booklet can be used for Rough Work.

Tear here DO NOT TEAR THIS COVER OF THE QUESTION BOOKLET UNTIL YOU ARE ASKED TO DO SO Tear here

1. With the increase in temperature, the resistance of the pure metals
 - A) increases
 - B) decreases
 - C) first increases and then decreases
 - D) remains constant.
2. Which of the following statements is false in case of a series circuit ?
 - A) The voltage drop across each resistor is the same
 - B) The current flowing through each resistor is the same
 - C) Applied voltage is equal to the sum of the voltage drops across individual resistors
 - D) Resistors are additive.
3. Which of the following relations is not correct ?
 - A) $P = \frac{V}{R^2}$
 - B) $P = VI$
 - C) $I = \sqrt{\frac{P}{R}}$
 - D) $V = \sqrt{PR}$.
4. Two alternating quantities are added
 - A) arithmetically
 - B) graphically
 - C) vectorially
 - D) geometrically.
5. All the rules and laws which apply to dc networks also apply to ac networks consisting of
 - A) resistance only
 - B) inductance only
 - C) capacitance only
 - D) all of these.
6. The resistor with least resistance is

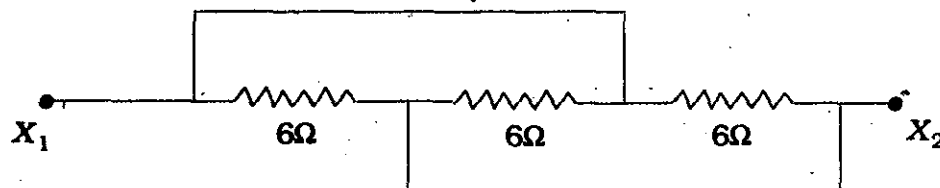


- A) R_1
- B) R_2
- C) R_3
- D) all of these are with same resistance.

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7. A capacitor
- offers easy path to a.c. but blocks d.c.
 - offers easy path to d.c. but blocks a.c.
 - offers easy path to both a.c. and d.c.
 - blocks a.c.
8. A unit impulse function is obtained on the differentiation of
- a unit ramp function
 - a unit step function
 - a unit triplet
 - a unit doublet.
9. The equation for 25 cycles current sine wave having rms value of 30 amperes, will be
- $30 \sin 25t$
 - $30 \sin 50t$
 - $42.4 \sin 25\pi t$
 - $42.4 \sin 50\pi t$
10. Three resistances of 6Ω each are connected as shown in fig. The equivalent resistance between X_1 and X_2 is



- 2Ω
 - 4Ω
 - 8Ω
 - 12Ω .
11. When a two-winding transformer is connected as an autotransformer, its efficiency (full-load)
- remains same
 - increases
 - decreases
 - rises to 100%.
12. A Δ/Y transformer has a phase-to-phase voltage transformation ratio of a (delta phase) : 1 (star phase). The line-to-line voltage ratio Y/Δ is given by
- $a/\sqrt{3}$
 - $a\sqrt{3}/1$
 - $\sqrt{3}/a$
 - a .
13. If the load on a dc shunt motor is increased, its speed decreases primarily due to
- increase in its flux
 - decrease in back emf
 - increase in armature current
 - decrease in brush drop.

14. DC series motors are best suited for traction because
- A) torque is proportional to the square of the armature current and speed is proportional to the torque.
 - B) torque is proportional to the square of the armature current and speed is inversely proportional to the torque.
 - C) torque and speed both are proportional to the square of the armature current.
 - D) none of these.
15. For a d.c. series motor with saturated condition of the field circuit, the torque developed is proportional to
- A) I_a^2
 - B) I_a
 - C) speed
 - D) voltage.
16. The damping winding in a synchronous motor is generally used to
- A) prevent hunting and provide the starting torque
 - B) reduce eddy currents
 - C) minimise vibrations
 - D) reduce noise level.
17. In a synchronous generator operating at zero *pf* lagging, the effect of armature reaction is
- A) magnetizing
 - B) demagnetizing
 - C) cross-magnetizing
 - D) both magnetizing and cross-magnetizing.
18. The disadvantage of starting an induction motor with a star-delta starter is that
- A) the starting torque is one-third of the torque in case of delta connection
 - B) during starting high losses result
 - C) the starting torque increases and the motor runs with jerks
 - D) none of these.
19. The advantage of starting a slip-ring induction motor with the help of rotor resistance as compared to other methods is that the
- A) starting torque increases due to rotor resistance
 - B) starting current is reduced
 - C) starter can be built directly into the rotor
 - D) none of these.

26. The impulse response of an $R-L$ circuit is a
- A) rising exponential function B) decaying exponential function
C) step function D) parabolic function.
27. A unity feedback second order control system is characterised by

$$G(s) = \frac{k}{s(js + B)}$$

- where j = moment of inertia
 k = system gain
 B = viscous damping coefficient.

The transient response specification which is not affected by variation of system gain is the

- A) peak overshoot B) rise time
C) setting time D) damped frequency of oscillations.
28. A system has the following transfer function :

$$G(s) = \frac{100(s+5)(s+50)}{s^4(s+10)(s^2+3s+10)}$$

The type and order of the system are respectively

- A) 4 and 9 B) 4 and 7
C) 5 and 7 D) 7 and 5.
29. A value of a matrix in $\ddot{X} = AX$ for the system described by the differential equation $y'' + 2y' + 3y = 0$ is

- A) $\begin{bmatrix} 1 & 0 \\ -2 & -1 \end{bmatrix}$ B) $\begin{bmatrix} 1 & 0 \\ -1 & -2 \end{bmatrix}$
C) $\begin{bmatrix} 0 & 1 \\ -2 & -1 \end{bmatrix}$ D) $\begin{bmatrix} 1 & 0 \\ -3 & -2 \end{bmatrix}$

30. Consider the following statements regarding a linear system $y = f(x_2)$:

- I. $f(x_1 + x_2) = f(x_2)$
II. $f[x(t+T)] = f[x(t)] + f[x(T)]$
III. $f(kx) = kf(x)$.

Of the statements :

- A) I, II and III are correct B) I and II are correct
C) III alone is correct D) I and III are correct.

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31. During load-shedding
- A) system voltage is reduced
 - B) system frequency is reduced
 - C) some loads are switched off
 - D) system power factor is changed.
32. The half-life period of an isotope is 1 hr. $15/16$ of it radiates out in
- A) 8 hrs
 - B) 16 hrs
 - C) 9 hrs
 - D) 5 hrs.
33. When a fixed amount of power is to be transmitted, the efficiency of transmission increases when
- A) voltage decreases, power factor remains constant
 - B) voltage increases, power factor increases
 - C) voltage decreases, power factor decreases
 - D) voltage constant, power factor decreases.
34. For a long uncompensated line the limit to the line loading is governed by
- A) thermal limit
 - B) voltage drop
 - C) stability limit
 - D) corona loss.
35. With 100% series compensation of lines
- A) the circuit is series resonant at power frequency
 - B) low transient voltage
 - C) high transient current
 - D) both (A) and (C).
36. The function of steel wire in an ACSR conductor is to
- A) take care of surges
 - B) prevent corona
 - C) reduce inductance and hence improve power factor
 - D) provide additional mechanical strength.
37. Nominal- π model is normally used for evaluating the performance of
- A) short line
 - B) medium line
 - C) long line
 - D) infinite line.
38. The inductance per unit length of an overhead line due to internal flux linkages
- A) depends on the size of the conductor
 - B) is independent of the size of conductor and constant
 - C) depends on the current through the conductor
 - D) depends on distance between conductors.

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79. According to the final value theorem

A) $F(0^-) = \lim_{s \rightarrow \infty} SF(s)$

B) $F(0^+) = \lim_{s \rightarrow \infty} SF(s)$

C) $F(\infty) = \lim_{s \rightarrow 0} SF(s)$

D) none of these.

80. The Z-parameters of a network are given by $\begin{bmatrix} 4 & 1 \\ 3 & 3 \end{bmatrix}$. Its transmission parameters will be

A) $\begin{bmatrix} 3 & 3 \\ 1 & 4 \end{bmatrix}$

B) $\begin{bmatrix} 4/3 & 3 \\ 1/3 & 1 \end{bmatrix}$

C) $\begin{bmatrix} 3 & 3 \\ 4 & 1 \end{bmatrix}$

D) $\begin{bmatrix} 3 & 4/3 \\ 1 & 1/3 \end{bmatrix}$

81. Bandwidth, a frequency domain concept, is inductive of

A) rise time in time domain

B) settling time in time domain

C) steady state error in the domain

D) all of these.

82. In an analog PMMC 0-10 A ammeter is provided with no controlling mechanism and the moving parts are free to rotate. What will be the readings of the instrument if 1A (d.c.) is passed through the moving coil?

(The torque produced is sufficient to overcome the frictional losses)

A) 1A

B) 10A

C) The pointer will continuously rotate

D) The pointer will remain stationary.

83. Permanent magnets are tested by

A) ballistic methods

B) using an electric circuit having a mutual inductance

C) potentiometric methods

D) Betteridge apparatus.

84. The voltage control circuits do not use resistance potential dividers because

A) they involve a large power loss

B) they cause distortion of waveform

C) they do not give a smooth variation of voltage

D) they have non-linear characteristics.

85. If an induction type energymeter runs fast, it can be slowed down by
- A) lag adjustment
 - B) light load adjustment
 - C) by adjusting the position of braking magnet and making it come closer to the centre of the disc
 - D) by adjusting the position of braking magnet and making it move away from the centre of the disc.
86. The secondary winding of a C.T. is open when current is flowing in the primary. Then,
- A) there will be a high current in primary
 - B) there will be a high voltage in secondary
 - C) the transformer will burn out immediately
 - D) the meter will burn out.
87. A potentiometer is basically a
- A) deflectional type instrument
 - B) null type instrument
 - C) deflectional as well as null type instrument
 - D) a digital instrument.
88. The ratio of transformation in the case of potential transformers
- A) increases with increase in power factor of secondary burden
 - B) remains constant irrespective of the power factor of secondary burden
 - C) decreases with increase in power factor of secondary burden
 - D) none of these.
89. Ballistic test is used in magnetic measurements for
- A) determination of B-H curve of the specimen only
 - B) determination of hysteresis loop of the specimen only
 - C) determination of flux density, magnetizing force and B-H curve and hysteresis loop of the specimen
 - D) finding out iron losses in the specimen.

90. Which type of wattmeter cannot be used for D.C. ?
- A) Electrostatic type B) Dynamometer type
C) Induction type D) None of these.
91. A DVM has a $4\frac{1}{2}$ digit display. The 1 volt range can read upto
- A) 9999 B) 999
C) 1.9999 D) 0.19999.
92. The horizontal sweep speed is set so that a full cycle takes 0.4 m/sec. The resulting display for one sweep of beam will be
- A) two cycles of the input signal
B) one cycle of the input signal
C) half cycle of the input signal
D) one-fourth cycle of the input signal.
93. A disc mounted on the shaft of a machine has 12 pattern points. The number of flashes projected on the disc by a stroboscope is 6000 in a minute. When the disc appears stationary and it has single image of 12 points, the speed of the machine will be
- A) 5 rps B) 50 rpm
C) 500 rpm D) 50 rps.
94. A digital voltmeter measures
- A) peak value B) peak to peak value
C) rms value D) average value.
95. Which of the following statements about CRO is correct ?
- A) The lissajous pattern obtained in a CRO is used to measure distortion in the input signal.
B) The colour of the spot on the screen of a CRO is a characteristic of the electron gun in a CRT.
C) The time base signal in a CRO is a square waveform.
D) None of these.

101. A resistance thermometer is an example of
- A) zero order system B) first order system
C) second order system D) none of these.
102. The unit of static sensitivity is
- A) millimetre per microampere B) millimetre per milliampere
C) micrometre per microampere D) micrometre per milliampere.
103. Random errors are otherwise known as
- A) residual errors B) gross errors
C) threshold errors D) instrumental errors.
104. An undamped second order instrument has a natural frequency of 500 Hz. It is subjected to a sinusoidal input of unit amplitude at 500 Hz. The amplitude of output is
- A) unity B) 0.5
C) 2.0 D) infinity.
105. A d.c. circuit can be represented by a voltage source of 10V in series with an output resistance of 1 k Ω . An ammeter of 50 Ω resistance is connected to the source terminals for measurement of current. The accuracy of measurement is nearly
- A) - 4.8 per cent B) + 4.8 per cent
C) 99 per cent D) 95.2 per cent.
106. A first order thermometer has a time constant of 50s. It is subjected to sinusoidal input cycling at 0.002 Hz. The time lag of the instrument is
- A) 50s B) 500s
C) 44.6s D) 0.01s.
107. A first order system has a time constant of 20s. It is subjected to a step input. The settling time of the output is assumed to be the time it reaches 95% of its final steady state value. The settling time of the system is
- A) 100s B) 50s
C) 60s D) 20s.

108. The voltage of a circuit is measured by a voltmeter having an input impedance comparable with the output impedance of the circuit thereby causing error in voltage measurement. This error may be called
- A) gross error
 - B) random error
 - C) error caused by misuse of instrument
 - D) error caused by loading effect.
109. The dead zone in a certain pyrometer is 0.125% of span. The calibration is 400°C to 1000°C. What temperature change might occur before it is deflected ?
- A) 0.075°C
 - B) 0.75°C
 - C) 7.5°C
 - D) 1.5°C.
110. Changes in atmospheric temperature, humidity etc. cause
- A) systematic errors
 - B) instrumental errors
 - C) cumulative errors
 - D) environmental errors.
111. A capacitive displacement transducer has plates of area 200 mm². The distance between plates is variable. The dielectric medium is air. The capacitor connected at the input end of the OP-AMP has a capacitance of 100 pF and voltage of 10V. $\epsilon_0 = 8.85 \times 10^{-12}$.
- The sensitivity of the transducer will be
- A) 0.057×10^6 V/mm
 - B) 0.057×10^3 V/mm
 - C) 0.057 V/mm
 - D) 0.057 mV/mm.
112. Three types of temperature transducers are compared as regards their sensitivity. The order in which they exhibit their sensitivities (highest to lowest) is
- A) Thermistors, RTDs, thermocouples
 - B) Thermocouples, RTDs, thermistors
 - C) RTDs, thermistors, thermocouples
 - D) RTDs, thermocouples, thermistors.
113. Dunmore hygrometer has
- A) linear resistance / relative humidity characteristics
 - B) non-linear resistance / relative humidity characteristics
 - C) linear inductance / relative humidity characteristics
 - D) non-linear inductance / relative humidity characteristics.

114. The microphones, which are widely used for sound measurement systems having a very wide range of amplitudes are
- A) carbon microphones B) piezoelectric microphones
C) inductive microphones D) capacitive microphones.
115. A $100\ \Omega$ resistive potentiometer is used with an input supply voltage of 10V. If the thermal resistance $30^\circ\text{C}/\text{W}$ and the ambient temperature is 40°C , the temperature of the POT is
- A) 60°C B) 80°C
C) 70°C D) 100°C .
116. In wire-wound strain gauges, the change in resistance on application of strain is mainly due to
- A) change in length of wire
B) change in diameter of wire
C) change in both length and diameter of wire
D) change in receptivity.
117. Piezoelectric transducers are
- A) passive transducers B) active transducers
C) inverse transducers D) (B) and (C).
118. Piezoelectric accelerometer
- A) should not be used for high frequencies above 100 Hz
B) should be used for low frequencies
C) should use a monitoring source of low input impedance
D) has a low natural frequency.
119. Capacitive transducers can be used for measurement of liquid level. The principal of operation used in this case is
- A) change of capacitance with change of distance between plates
B) change of area of plates
C) change of dielectric strength
D) none of these.
120. A transducer has an output impedance of $1\text{k}\Omega$ and the load resistance is $1\text{M}\Omega$. The transducer behaves as
- A) a constant current source B) a constant voltage source
C) a constant power source D) none of these.

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128. Hoop stress acts
- A) in radial direction B) in axial direction
C) in both radial and axial directions D) none of these.
129. When accelerometers operate in the displacement mode the ratio of forcing frequency to natural frequency should be
- A) below 1 B) below 2
C) above 2 D) above 200.
130. Hydraulic load cells are available which have a maximum capacity of
- A) 10 kN B) 50 kN
C) 10 MN D) 50 MN.
131. The size of a venturimeter is expressed as 200×100 mm. It means that
- A) the diameter of the upstream pipe is 200 mm and that of downstream pipe 100 mm
B) the diameter of the pipe is 200 mm and that of throat is 100 mm
C) the diameter of the pipe is 100 mm and that of throat is 200 mm
D) none of these.
132. The accuracy of the dead weight testers is affected by
- A) friction force between the piston and the cylinder
B) uncertainty of the value of the effective area of the piston
C) uncertainty of the value of gravitational constant
D) all of these.
133. Bridgman gauges are used for measurement of
- A) vacuum B) medium pressures
C) high pressures D) very high pressures.
134. The desirable property of a monometric fluid is
- A) high viscosity
B) high coefficient of thermal expansion
C) low vapour pressure
D) corrosiveness and stickiness.

158. Which of the following control actions is referred to as anticipatory control action ?
- A) Integral control action
 - B) Proportional control action
 - C) Derivative control action
 - D) Proportional + Integral control action.
159. The main advantage of combining integral control action to proportional action is
- A) short recovery time
 - B) maximum overshoot
 - C) elimination of offset
 - D) none of these.
160. Due to derivative control, the steady-state error is
- A) ratio control reduced
 - B) cascade control increased
 - C) split range control not effected
 - D) inferential control made zero.
161. Blood flow can be measured using the electromagnetic principle because blood has a high
- A) magnetic induction
 - B) electrical resistivity
 - C) electrical conductivity
 - D) impedance.
162. An ECG monitor usually has a frequency response of 0.05 Hz to about
- A) 45 Hz
 - B) 60 Hz
 - C) 70 Hz
 - D) 100 Hz.
163. A cardioverter is a defibrillator that is synchronized to discharge only on the patient's
- A) T-wave
 - B) R-wave
 - C) P-wave
 - D) Q-wave.
164. Polarised cell resting potential is about
- A) - 90 mV
 - B) + 90 mV
 - C) - 45 mV
 - D) + 20 mV.
165. Loudspeaker is also used in the recorder of
- A) EMG
 - B) ECG
 - C) EOG
 - D) EEG.

166. The use of notch filter in signal conditioning system is to
- A) filter R.F. noise
 - B) filter 50 Hz noise from mains
 - C) filter the signal from various noises
 - D) attenuate the evolved response potentials.
167. In the case of ERG, what type of electrodes are used to pick-up signals ?
- A) Disc electrodes
 - B) Retinal electrodes
 - C) Vacuum type electrodes
 - D) pH electrodes.
168. The active transducer in the measurement of pressure is
- A) piezoelectric transducer
 - B) capacitive transducer
 - C) strain gauge
 - D) inductive transducer.
169. Arrhythmia can be diagnosed by
- A) EEG
 - B) ECG
 - C) Vector cardiogram
 - D) Phono-cardiography.
170. In the case of defibrillator, a double square pulse type is used to
- A) restart the heart rhythm after the open heart surgery
 - B) arrest ventricular fibrillation
 - C) arrest leakage of blood from the heart
 - D) arrest the reverse flow of blood from ventricle to atrium.
171. The beam width between first-null of uniform linear array of N equally spaced (element spacing = d) equally excited antennas is determined by
- A) N alone and not by d
 - B) d alone and not by N
 - C) the ratio (N/d)
 - D) the product (Nd).
172. The Nyquist sampling rate for the signal $g(t) = 10 \cos(50\pi t) \cos^2(150\pi t)$ where t is in seconds, is
- A) 150 samples per second
 - B) 200 samples per second
 - C) 300 samples per second
 - D) 350 samples per second.

179. Source encoding in a data communication system is done in order to
- A) enhance the information transmission rate
 - B) increase the transmission errors
 - C) conserve the transmitted power
 - D) facilitate clock recovery in the receiver.
180. The root locus always starts as
- A) open loop poles
 - B) open loop zeros
 - C) closed loop poles
 - D) closed loop zeros.
181. The interface chip used for data transmission between 8086 and a 16 bit ADC is
- A) 8259
 - B) 8255
 - C) 8253
 - D) 8251.
182. The TRAP is one of the interrupts available in INTEL 8085. Which one of the following statements is true of TRAP ?
- A) It is level triggered
 - B) It is negative edge triggered
 - C) It is positive edge triggered
 - D) It is both positive edge triggered and level triggered.
183. In 8085 microprocessor system, the direct addressing instructions is
- A) Mov A, B
 - B) Mov B, OAH
 - C) Mov C, M
 - D) STA add.
184. A ROM is used to store the table for multiplication of two 8-bit unsigned integers. The size of ROM required is
- A) 256 k × 16
 - B) 64 k × 8
 - C) 4 k × 16
 - D) 64 k × 16.

185. The following program is run on an 8085 Microprocessor :

<i>Memory address in hex</i>	<i>Instruction</i>
2000	LXISP, 1000
2003	PUSH H
2004	PUSH D
2005	CALL 2050
2008	POPH
2009	HLT

At the completion of execution of the program, the program counter of the 8085 contains and the stack pointer contains

- | | |
|---------------|----------------|
| A) 2050, OFFC | B) 2020, OCCF |
| C) 2000, CCFO | D) 2020, OFFC. |

186. In a generic microprocessor, instruction cycle time is

- A) shorter than machine cycle time
- B) larger than machine cycle time.
- C) exactly double the machine cycle time
- D) exactly the same as the machine cycle time.

187. The stack pointer in the 8085 microprocessor is a

- A) 16 bit register that points to stack memory locations
- B) 16 bit accumulator
- C) memory location in the stack
- D) flag register used for the stack.

188. Match **List I** (Request) correctly with **List II** (Device) and select your answer using the codes given below :

List I	List II
a) Interrupt	1. I/O device
b) Wait	2. DMA controller
c) Hold	3. Memory

Codes :

	a	b	c
A)	1	2	3
B)	1	3	2
C)	2	1	3
D)	2	3	1.

189. An 'Assembler' for a microprocessor is used for
- A) assembly of processors in a production line
 - B) creation of new programmes using different modules
 - C) translation of a program from assembly language to machine language
 - D) translation of a higher level language into English text.
190. In a multiprocessor configuration, two coprocessors are connected to the host 8086 processor. The two coprocessor instruction sets
- A) must be the same
 - B) may overlap
 - C) must be disjoint
 - D) must be the same as that of the host.
191. In DC8 the available method for security design approach is
- A) manual back-up approach
 - B) hot stand-by redundancy approach
 - C) multiple active redundant controller
 - D) all of these.
192. Which one of the following methods is not a network topology ?
- A) Star
 - B) Token-passing
 - C) Ring
 - D) Mesh.
193. Which one of the following is not an operator display device ?
- A) Menu
 - B) Indicator
 - C) Alarm
 - D) Screen area.
194. What size computers are used for supervisory control application ?
- A) Mainframe computer
 - B) Minicomputer
 - C) Microcomputer
 - D) None of these.
195. A supervisory control has been applied in chemical process to
- A) minimize operating cost
 - B) maximize efficiency in raw material utilization
 - C) maximize production profit
 - D) all of these.

(SPACE FOR ROUGH WORK)

RECT

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(SPACE FOR ROUGH WORK)